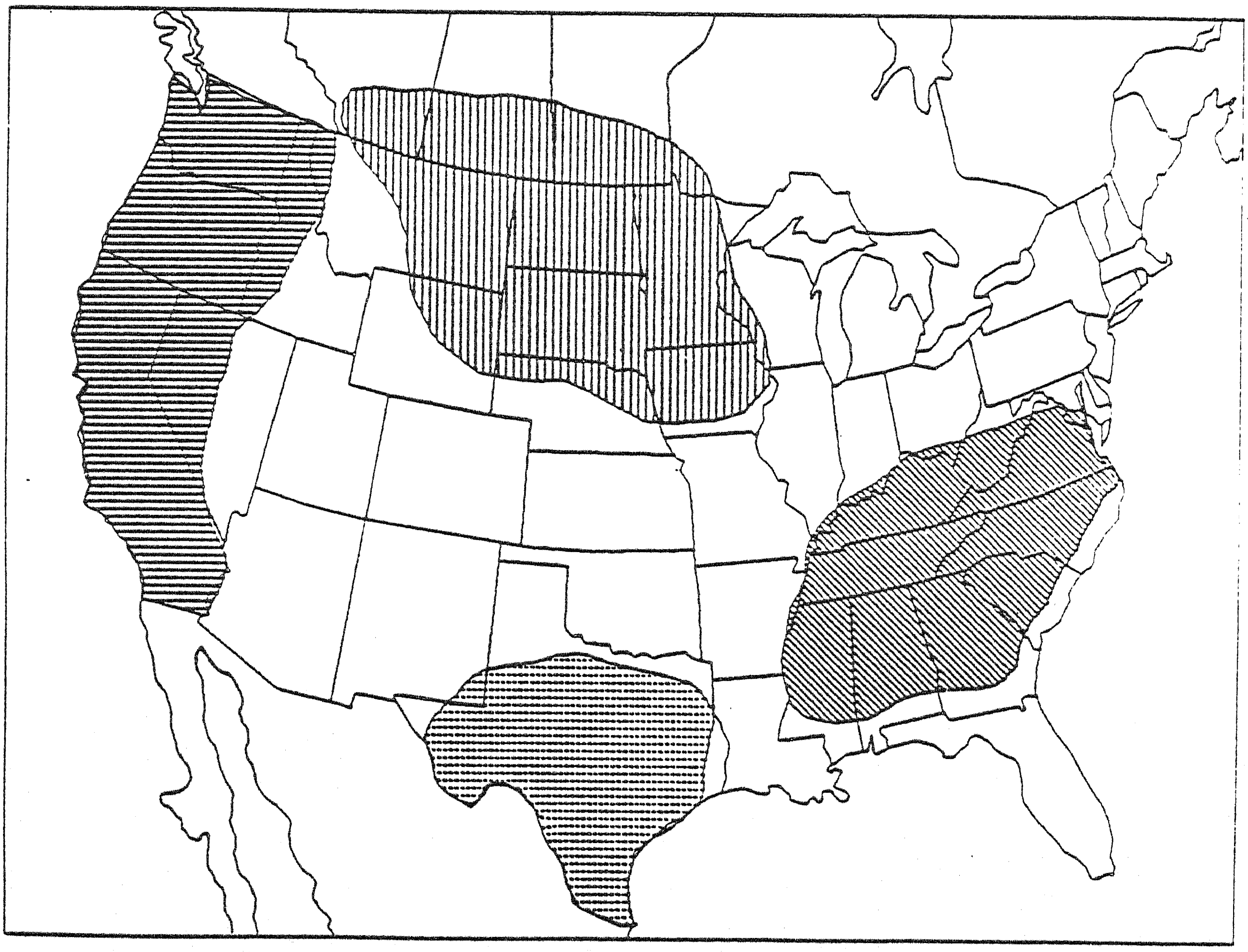
CLIMATE ANALYSIS CENTER

WEEKLY CLIMATE BULLETIN

No. 88/20 Washington, DC May 14, 1988



IN RECENT TIMES, SEVERAL PARTS OF THE CONTIGUOUS UNITED STATES HAVE BEEN AFFLICTED WITH ABNORMALLY DRY CONDITIONS. THE FOUR AREAS OUTLINED ABOVE ARE CURRENTLY EXPERIENCING PRECIPITATION DEFICIENCIES THAT HAVE PERSISTED FOR SEVERAL MONTHS OR FOR SEVERAL YEARS. REFER TO THE SPECIAL CLIMATE SUMMARY TO OBTAIN ADDITIONAL INFORMATION ON THE DURATION AND SEVERITY OF EACH REGION'S ANOMALOUS DRYNESS.

NOAA - NATIONAL WEATHER SERVICE - NATIONAL METEOROLOGICAL CENTER

WEEKLY CLIMATE BULLETIN

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This Bulletin is issued weekly by the Climate Analysis Center and is designed to indicate, in a brief, concise format, current surface climatic conditions in the United States and around the world. The Bulletin contains:

Highlights of major global climatic events and anomalies.
U.S. climatic conditions for the previous week.
U.S. apparent temperatures (summer) or wind chill (winter).
Global two-week temperature anomalies.
Global four-week precipitation anomalies.
Global monthly temperature and precipitation anomalies.
Global three-month precipitation anomalies (once a month).
Global twelve-month precipitation anomalies (every 3 months).
Global temperature anomalies for winter and summer seasons.
Special climate summaries, explanations, etc. (as appropriate).

Most analyses contained in this Bulletin are based on preliminary, unchecked data received at the Center via the Global Telecommunication System. Similar analyses based on final, checked data are likely to differ to some extent from those presented here.

To receive copies of the Bulletin or change mailing address, write to:

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NOAA, National Weather Service
Washington, DC 20233
Phone: (301)-763-8071

GLOBAL HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF MAY 14, 1988
(Approximate duration of anomalies is in brackets.)

1. North Central U.S.A. and South Central Canada:
DRYNESS CONTINUES.
Light rain, up to 20.3 mm (0.80 inches), was recorded at some stations; however, the area remained unusually dry (see Special Climate Summary) [9 weeks].

2. Eastern United States:
NEAR NORMAL TEMPERATURES RETURN.
Temperatures moderated to near or above normal in much of the eastern United States [Ended at 4 weeks].

3. Central and Southern United States:
UNUSUALLY DRY CONDITIONS PREVAIL.
Rainfall amounted to 12.0 mm (0.47 inch) or less as dryness spread across much of the southern and central United States (see Special Climate Summary) [6 weeks].

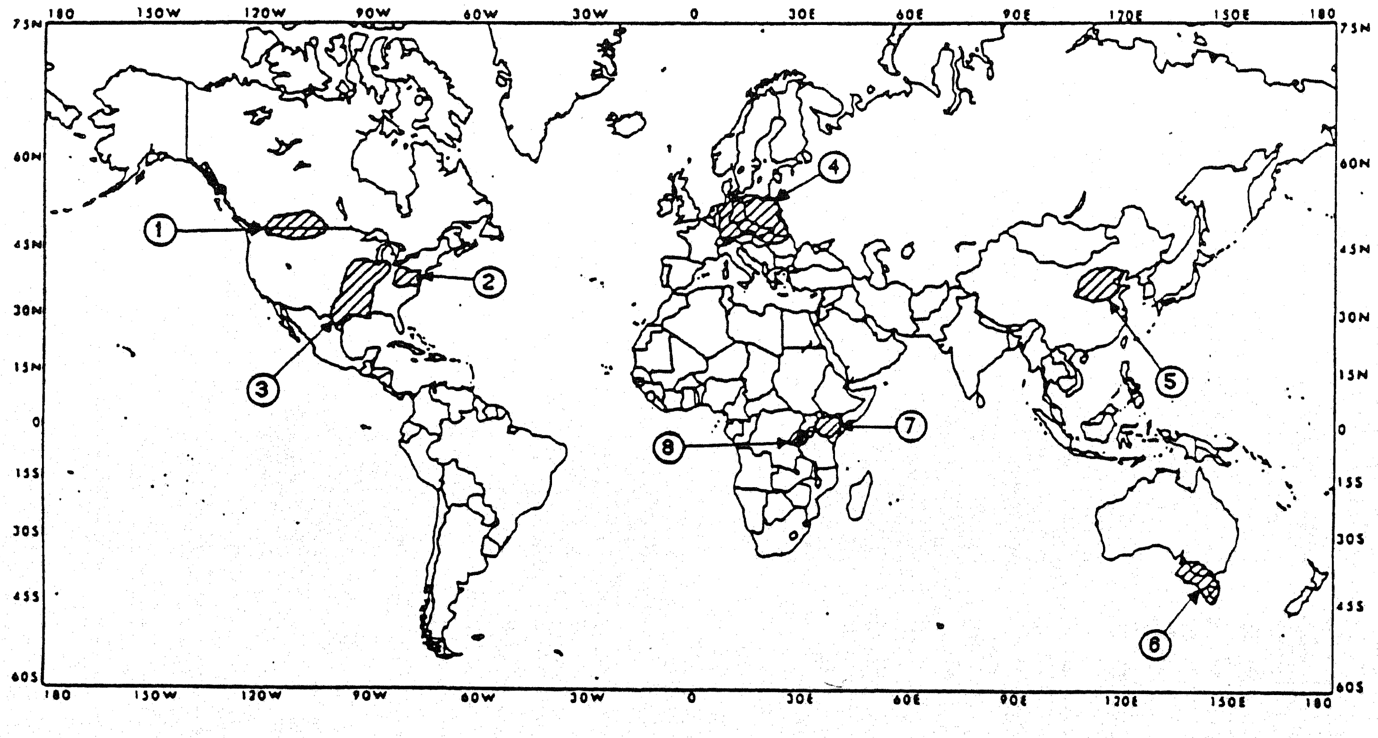
4. Europe:
DRYNESS SPREADS.
Most stations reported less than 17.8 mm (0.70 inch) of rain as much of Europe from West Germany and Switzerland eastward into Poland and Romania became very dry [6 weeks].

5. East Central China:
DRYNESS RETURNS.
Little or no rainfall occurred in east centr
China as unusually dry conditions prevailed
weeks].

6. Australia:
ABOVE NORMAL TEMPERATURES DIMINISH.
Temperatures were generally less than 4.2°
(7.6°F) above normal [Ending at 7 weeks].

7. Kenya:
TORRENTIAL RAINS END.
Less than 40.5 mm (1.60 inches) fell in centr
and western Kenya as conditions returned to ne
normal [Ended at 6 weeks].

8. Rwanda:
HEAVY RAINS IN THE NORTH.
Heavy rains, up to 83.3 mm (3.28 inches), fell
parts of northern Rwanda last week and caus
floods and landslides according to press repor
[Episodal Event].



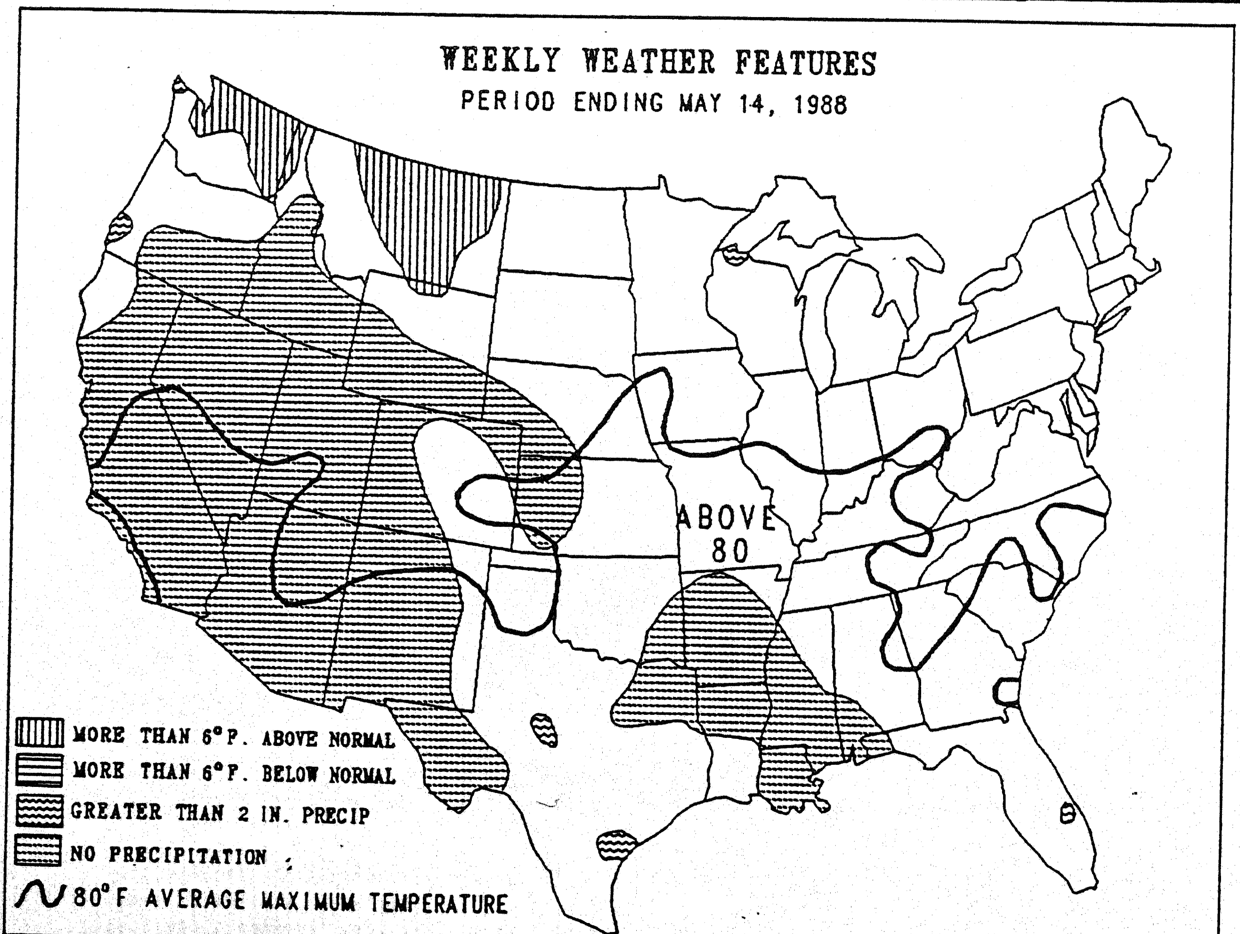
Approximate locations of the major anomalies and events described above are shown on ~~this~~ map. See the other world maps in this Bulletin for current two-week temperature anomalies, four-week precipitation anomalies, and (occasionally) longer-term anomalies.

U.S. WEEKLY WEATHER HIGHLIGHTS

FOR THE WEEK OF MAY 8 THROUGH MAY 14, 1988

Precipitation amounts were generally light across much of the United States last week. The few exceptions to this included parts of central and southeastern Texas and portions of the upper Midwest, where strong thunderstorms occurred, and along the coasts of Washington, Oregon, and south-central Alaska, where isolated heavy rains fell (see Table 1). Light to moderate totals were measured in most of the Pacific Northwest, northern Great Plains, Texas, Midwest, and the eastern third of the country. Rainfall amounts, however, were highly variable in the Midwest and Southeast as scattered showers and thunderstorms dropped anywhere from 0.1 to 1.9 inches. The Southwest, Great Basin, southern half of the Rockies, and from the central Great Plains southeastwards into southern Mississippi and Alabama observed little or no rainfall. The lack of significant precipitation late last year and so far this year has created anomalously dry conditions in parts of the western, northern, southern, and southeastern U.S. For further details on the four regions, refer to the Special Climate Summary.

Warm weather dominated much of the country as the cool conditions in the south-central and eastern U.S. were replaced by more seasonable temperatures. Greatest departures above normal (between +6 to +10°F) were located in the Pacific Northwest, northern Rockies, desert Southwest, and throughout much of Alaska (see Table 2). Several cities in the northwestern U.S. established new daily record maximum temperatures early in the week, while temperatures well over 100°F were common in the desert Southwest. Elsewhere, readings in the eighties were observed across much of the nation and south-central Canada. Slightly below normal temperatures (between -1 to -4°F) occurred in southwestern and southeastern Texas, near the western Great Lakes, along the Gulf Coast, and from Florida northward along the Atlantic Coast to Maine.



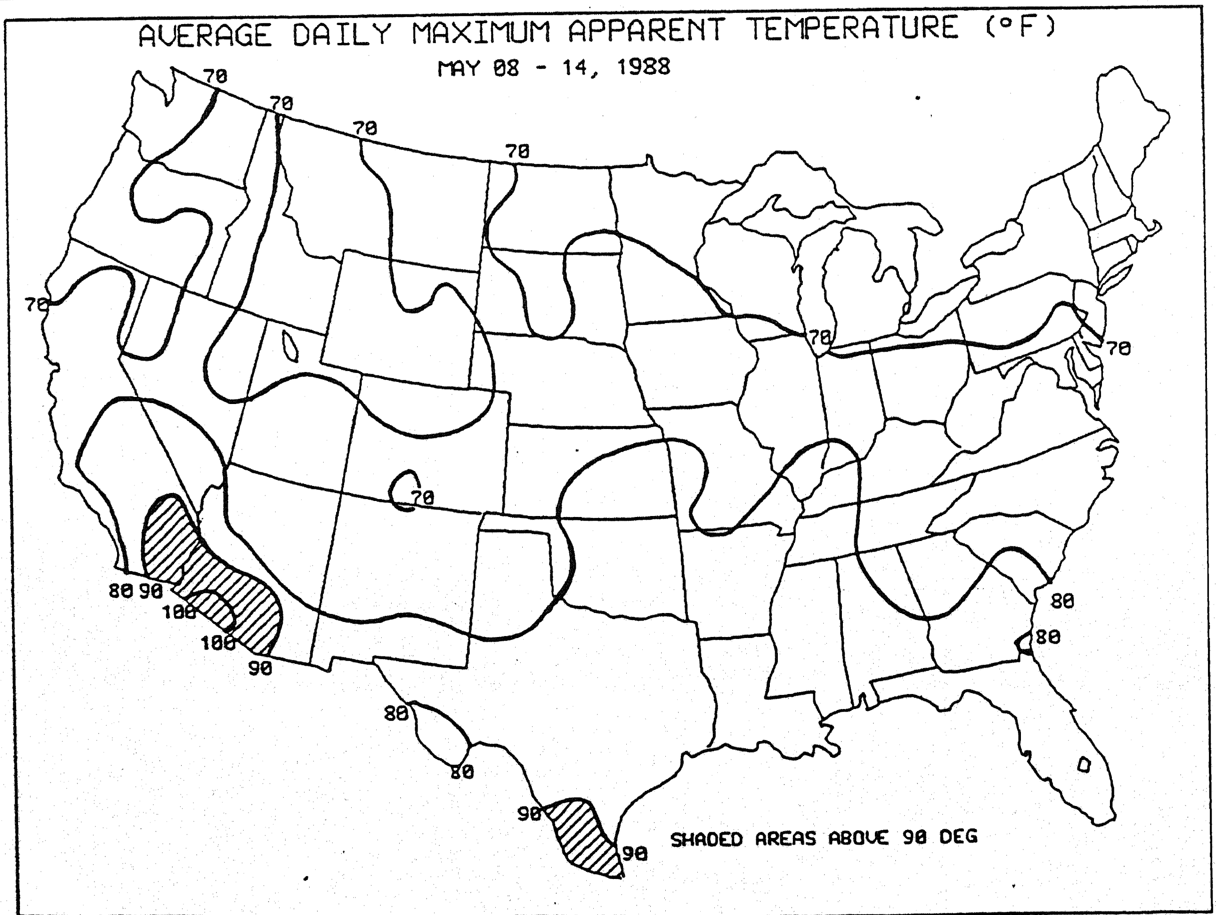
Note: The 80°F isotherm of the AVERAGE DAILY MAXIMUM TEMPERATURE now replaces the 32°F isotherm of the AVERAGE DAILY MINIMUM TEMPERATURE.

TABLE 1. Selected stations with more than an inch and a half of precipitation for the week.

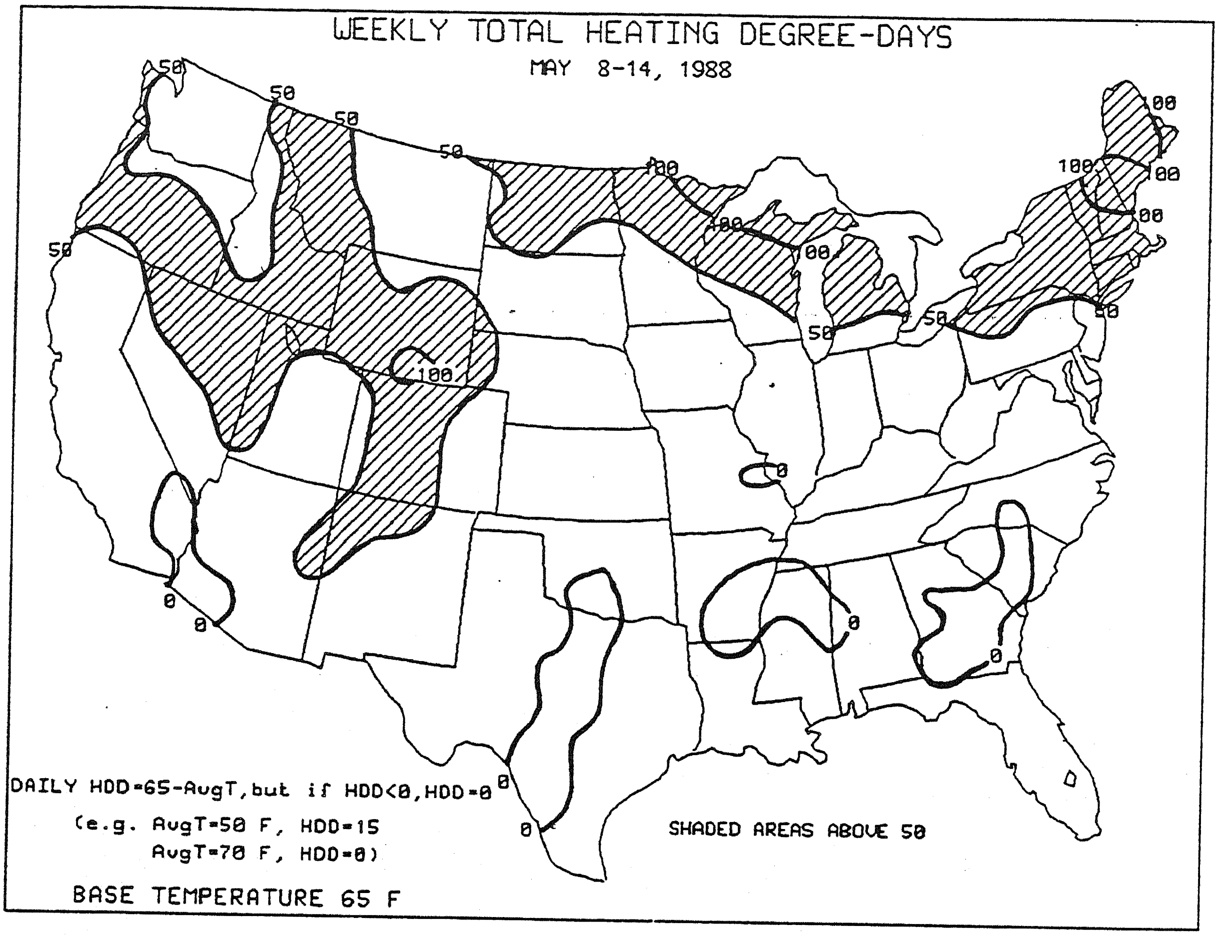
Yakutat, AK	3.74	Anniston, AL	1.88
Beeville NAS, TX	3.27	Cordova, AK	1.83
Duluth, MN	2.63	Rochester, MN	1.65
Corpus Christi NAS, TX	2.61	Eau Claire, WI	1.60
Quillayute, WA	2.06	Park Falls, WI	1.57
San Angelo, TX	1.99	Valdosta, GA	1.57
Mansfield, OH	1.93	Waterloo, IA	1.54

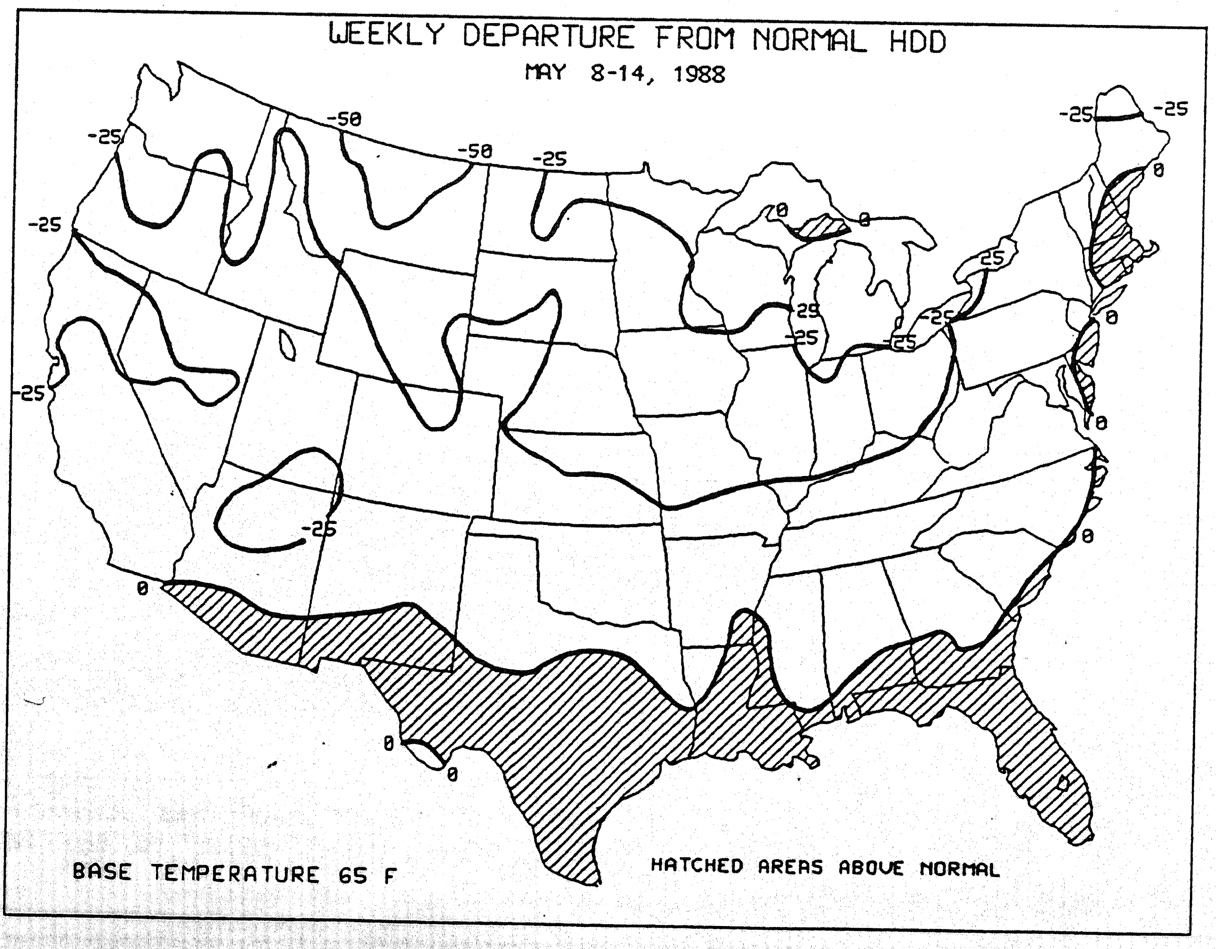
TABLE 2. Selected stations with temperatures averaging greater than 6°F ABOVE normal for the week.

Station	TDepNml	AvgT(°F)	Station	TDepNml	AvgT(°F)
Fairbanks, AK	+10	56	Havre, MT	+ 8	62
San Bernardino, CA	+10	74	Kotzebue, AK	+ 7	37
Omak, WA	+ 9	65	Talkeetna, AK	+ 7	50
Phoenix, AZ	+ 9	84	Tucson, AZ	+ 7	79
Northway, AK	+ 8	50	Lewiston, MT	+ 7	56
Glendale/Luke AFB, CA	+ 8	83	Bellingham, WA	+ 7	59
Thermal, CA	+ 8	85	Juneau, AK	+ 7	53
Billings, MT	+ 8	62	Unalakleet, AK	+ 7	44
Glasgow, MT	+ 8	62	Lewiston, ID	+ 7	64
McGrath, AK	+ 8	51	Redmond, OR	+ 7	57
Sitka, AK	+ 8	52	Olympia, WA	+ 7	59
Cut Bank, MT	+ 8	57			



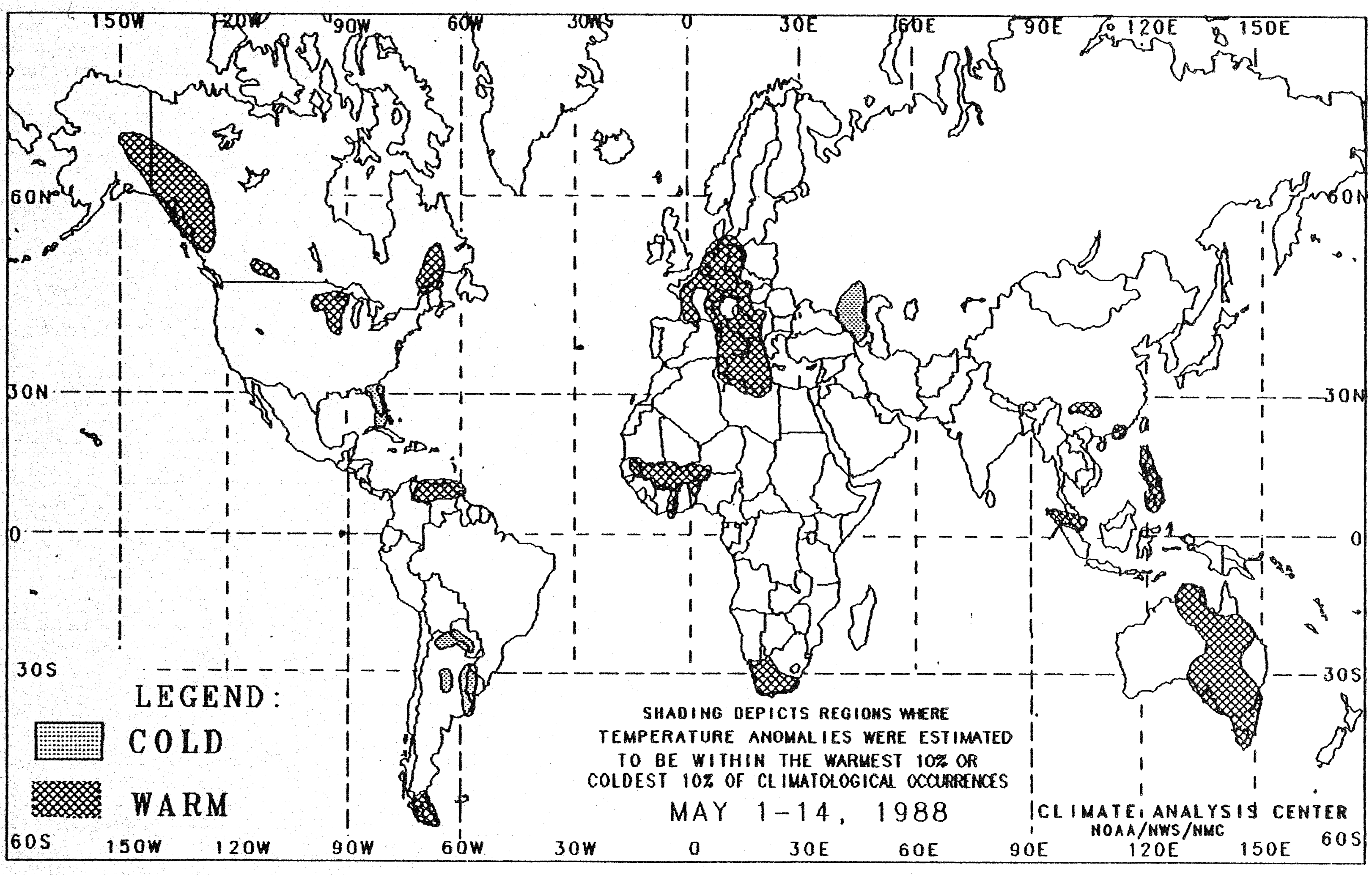
Note: The AVERAGE DAILY MAXIMUM APPARENT TEMPERATURE chart has commenced. For further information on apparent temperature, refer to the last page of this issue.


WEEKLY TOTAL HEATING DEGREE-DAYS
MAY 8-14, 1988
DAILY HDD=65-AvgT, but if HDD<0, HDD=0
(e.g. AvgT=50 F, HDD=15
AvgT=70 F, HDD=0)
BASE TEMPERATURE 65 F
SHADED AREAS ABOVE 50


WEEKLY DEPARTURE FROM NORMAL HDD
MAY 8-14, 1988
BASE TEMPERATURE 65 F
HATCHED AREAS ABOVE NORMAL

GLOBAL TEMPERATURE ANOMALIES

2 Week



The anomalies on this chart are based on approximately 2500 observing stations for which at least 13 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty-four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

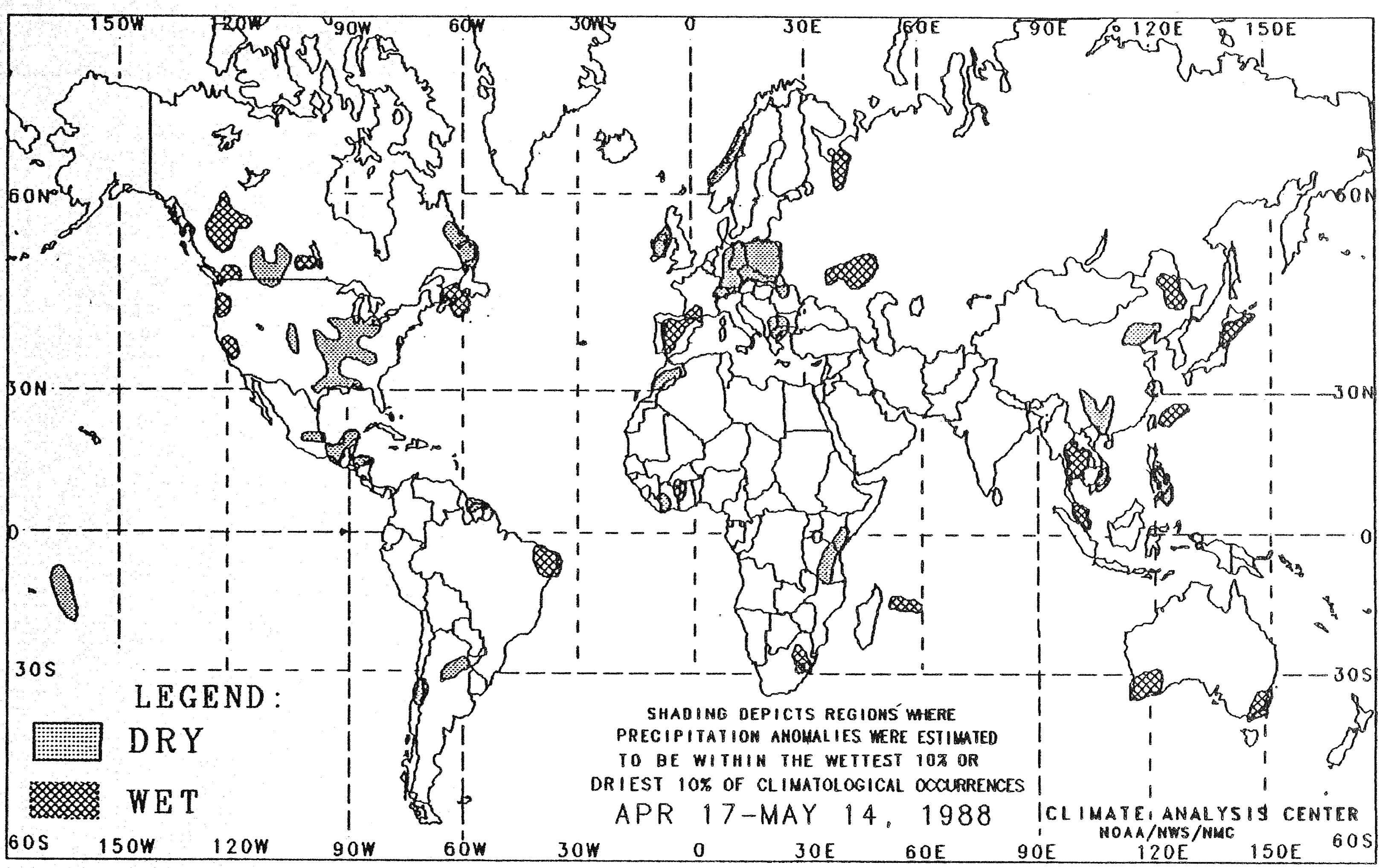
Temperature anomalies are not depicted unless the magnitude of temperature departures from normal exceeds 1.5°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining precentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

GLOBAL PRECIPITATION ANOMALIES

4 Week



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

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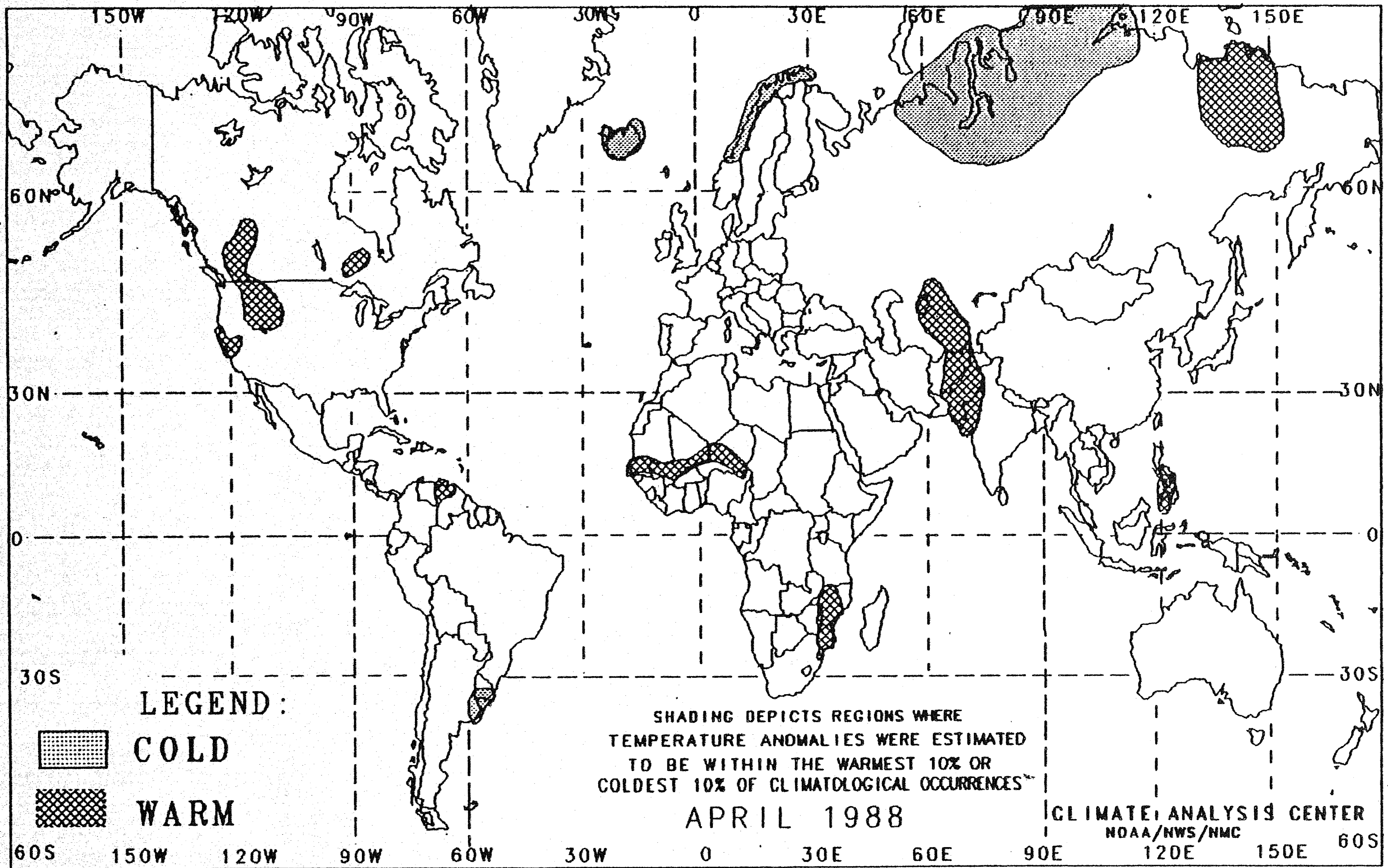
GLOBAL TEMPERATURE ANOMALIES

Monthly



The anomalies on this chart are based on approximately 2500 observing stations for which at least 26 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty-four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

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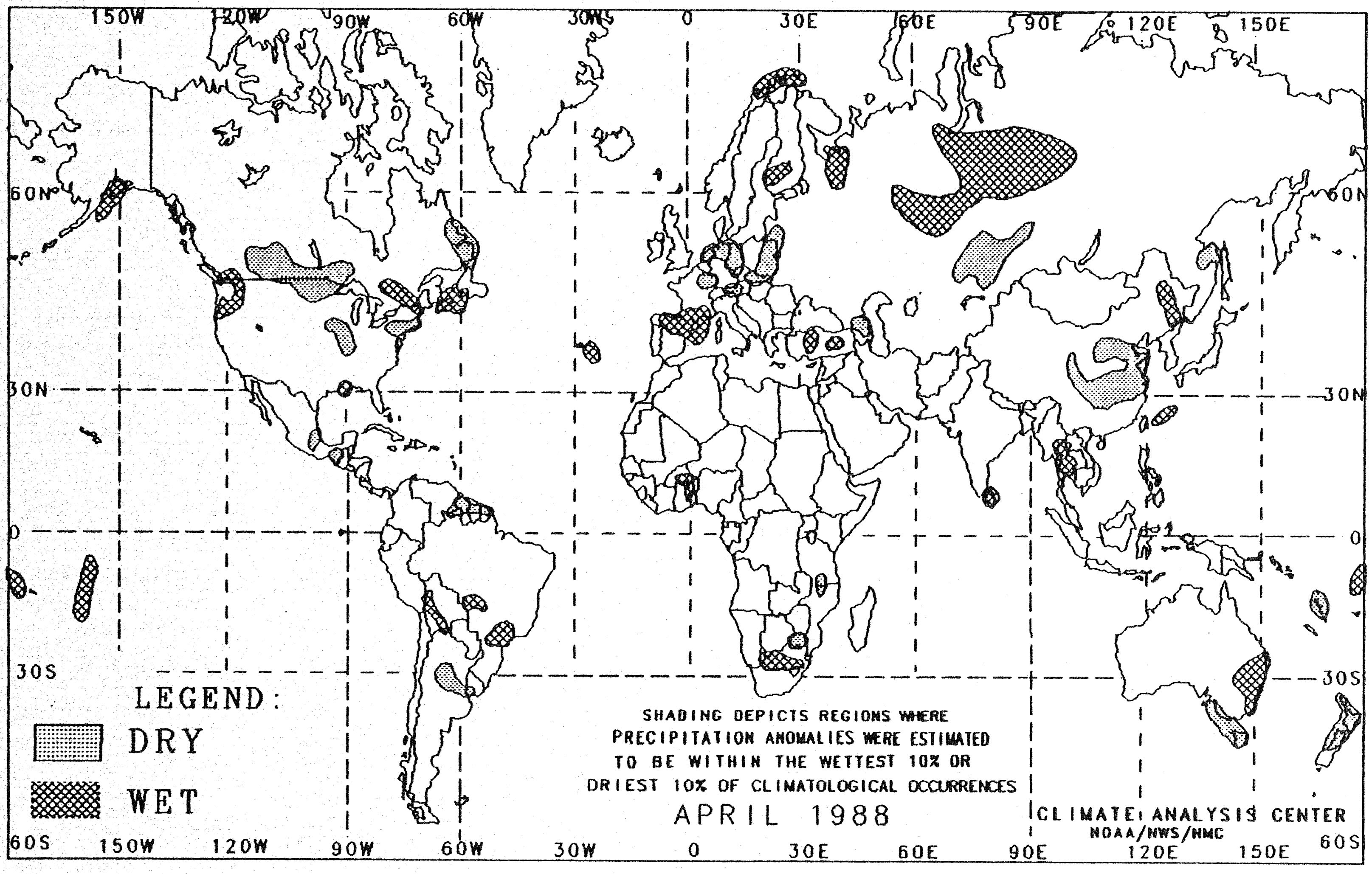
The chart shows general areas of one month temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

PRINCIPAL TEMPERATURE ANOMALIES - APRIL 1988

REGIONS AFFECTED	TEMPERATURE AVERAGE (C)	DEPARTURE FROM NORMAL (C)	COMMENTS
NORTHWESTERN UNITED STATES AND SOUTHWESTERN CANADA	+1 TO +13	+2 TO +6	MILD - 7 TO 12 WEEKS
NORTHERN CALIFORNIA AND WESTERN NEVADA	+11 TO +15	+2 TO +3	WARM - 8 TO 10 WEEKS
WEST CENTRAL ONTARIO	AROUND +1	AROUND +3	VERY MILD EARLY AND LATE IN APRIL
VENEZUELA	+28 TO +31	AROUND +2	WARM - 2 TO 5 WEEKS
URUGUAY AND ARGENTINA	+11 TO +16	AROUND -2	VERY COOL EARLY AND LATE IN APRIL
ICELAND	-2 TO +1	-3 TO -4	VERY COOL MIDDLE OF APRIL
NORWAY	-9 TO +2	-2 TO -4	COLD - 2 TO 4 WEEKS
SAHEL REGION	+31 TO +35	+2 TO +3	WARM - 6 TO 11 WEEKS
MOZAMBIQUE	+20 TO +27	AROUND +2	WARM - 2 TO 7 WEEKS
NORTHWESTERN SIBERIA	-27 TO -7	-3 TO -7	COLD - 2 TO 5 WEEKS
NORTHWESTERN INDIA, PAKISTAN, AFGHANISTAN, AND ADJACENT SOVIET UNION	+10 TO +33	+2 TO +8	WARM - 2 TO 4 WEEKS
NORTHEASTERN SIBERIA	-16 TO 0	+3 TO +5	MILD - 7 WEEKS
PHILIPPINES	+29 TO +30	AROUND +2	WARM - 24 WEEKS

GLOBAL PRECIPITATION ANOMALIES

Monthly



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The chart shows general areas of one month precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

PRINCIPAL PRECIPITATION ANOMALIES - APRIL 1988

REGIONS AFFECTED	PRECIPITATION TOTAL (MM)	PERCENT OF NORMAL	COMMENTS
SOUTH CENTRAL ALASKA	104 TO 169	183 TO 312	HEAVY PRECIPITATION MIDDLE OF APRIL
NORTHWESTERN UNITED STATES AND SOUTHWESTERN CANADA	56 TO 243	169 TO 313	HEAVY PRECIPITATION EARLY AND LATE IN APRIL
NORTH CENTRAL UNITED STATES AND SOUTH CENTRAL CANADA	0 TO 10	0 TO 46	DRY - 5 TO 33 WEEKS
IOWA AND ILLINOIS	19 TO 44	22 TO 49	DRY - 4 TO 6 WEEKS
SOUTHEASTERN ONTARIO, SOUTHERN QUEBEC, AND NORTHERN NEW HAMPSHIRE	84 TO 392	160 TO 392	HEAVY PRECIPITATION LATE IN APRIL
EASTERN PENNSYLVANIA AND SOUTHERN NEW ENGLAND	32 TO 40	36 TO 43	DRY - 4 TO 11 WEEKS
CANADIAN MARITIME PROVINCES	97 TO 273	163 TO 686	WET - 4 TO 7 WEEKS
LABRADOR	0 TO 0	0 TO 16	DRY - 5 TO 16 WEEKS
VICINITY OF NEW ORLEANS	AROUND 235	AROUND 207	WET - 8 TO 13 WEEKS
EAST CENTRAL MEXICO	0 TO 19	0 TO 60	DRY - 6 TO 8 WEEKS
EXTREME SOUTHERN MEXICO	AROUND 21	AROUND 23	DRY - 6 WEEKS
KIRIBATI AND FIJI ISLANDS	662 TO 617	211 TO 264	WET - 5 TO 7 WEEKS
COOK ISLANDS	319 TO 376	176 TO 214	HEAVY PRECIPITATION SECOND HALF OF APRIL
GUYANAS, SURINAME, AND EASTERN VENEZUELA	20 TO 162	12 TO 30	DRY - 6 TO 9 WEEKS
BOLIVIA	24 TO 60	26 TO 36	HEAVY PRECIPITATION EARLY IN APRIL
WEST CENTRAL BRAZIL	130 TO 228	183 TO 479	WET - 6 TO 11 WEEKS
VICINITY OF SAO PAULO, BRAZIL	126 TO 429	211 TO 324	WET - 5 WEEKS
URUGUAY AND ARGENTINA	0 TO 60	0 TO 49	DRY - 4 WEEKS
AZORES	112 TO 130	192 TO 269	WET - 4 TO 6 WEEKS
NORTHERN SPAIN AND SOUTHERN FRANCE	49 TO 217	202 TO 412	WET - 4 TO 6 WEEKS
VICINITY OF NANCY, FRANCE	10 TO 20	24 TO 39	DRY - 4 WEEKS
NETHERLANDS, WEST GERMANY, AND EAST GERMANY	1 TO 102	3 TO 49	DRY - 4 TO 5 WEEKS
AUSTRIA	13 TO 54	30 TO 48	DRY - 4 WEEKS

REGIONS AFFECTED	PRECIPITATION TOTAL (MM)	PERCENT OF NORMAL	COMMENTS
AUSTRIA	13 TO 64	30 TO 48	DRY - 4 WEEKS
CZECHOSLOVAKIA, POLAND, AND ADJACENT PARTS OF SOVIET UNION	2 TO 24	6 TO 46	DRY - 4 WEEKS
SOUTHWESTERN FINLAND	69 TO 77	104 TO 207	WET - 5 TO 10 WEEKS
NORTHERN NORWAY	73 TO 106	207 TO 330	WET - 4 TO 6 WEEKS
NORTHERN EUROPEAN RUSSIA	62 TO 87	217 TO 326	WET - 4 TO 6 WEEKS
SOVIET GEORGIA	1 TO 19	1 TO 34	DRY - 4 WEEKS
CENTRAL TURKEY	61 TO 84	222 TO 244	WET - 5 TO 8 WEEKS
SOUTHEASTERN TURKEY	120 TO 127	193 TO 202	WET - 5 TO 8 WEEKS
TOGO AND BURKINA FASO	80 TO 167	161 TO 410	WET - 4 TO 6 WEEKS
SOUTHWESTERN TANZANIA AND NORTHWESTERN MOZAMBIQUE	23 TO 30	26 TO 34	DRY - 4 TO 11 WEEKS
NORTHEASTERN SOUTH AFRICA	4 TO 36	12 TO 32	DRY - 6 TO 7 WEEKS
CENTRAL SOUTH AFRICA	72 TO 293	212 TO 726	WET - 6 TO 6 WEEKS
WESTERN SIBERIA	36 TO 98	100 TO 621	WET - 6 TO 7 WEEKS
KAZAKH S.S.R.	1 TO 36	3 TO 41	DRY - 4 TO 7 WEEKS
SOUTHEASTERN SIBERIA	9 TO 10	30 TO 37	DRY - 4 TO 6 WEEKS
NORTHEASTERN CHINA	49 TO 162	196 TO 637	WET - 4 TO 6 WEEKS
CENTRAL AND EASTERN CHINA	0 TO 135	0 TO 60	DRY - 4 TO 9 WEEKS
RYUKYU ISLANDS	344 TO 474	204 TO 326	WET - 4 TO 6 WEEKS
THAILAND	114 TO 274	217 TO 610	WET - 4 TO 6 WEEKS
SRI LANKA	177 TO 346	193 TO 196	WET - 4 TO 6 WEEKS
VANUATU ISLANDS	114 TO 100	30 TO 46	DRY - 4 WEEKS
EASTERN AUSTRALIA	63 TO 583	100 TO 587	WET - 4 TO 7 WEEKS
SOUTHEASTERN AUSTRALIA	1 TO 42	5 TO 46	DRY - 4 TO 16 WEEKS
NEW ZEALAND	1 TO 65	1 TO 33	DRY - 4 TO 9 WEEKS

SPECIAL CLIMATE SUMMARY

Climate Analysis Center, NMC
National Weather Service, NOAA

ABNORMALLY DRY CONDITIONS CURRENTLY EXIST IN THE WESTERN, SOUTHEASTERN, NORTH-CENTRAL, AND SOUTHERN UNITED STATES AND SOUTH-CENTRAL CANADA.

Even with April's above normal precipitation, much of the West measured another below normal "rainy season" (October-April). Parts of California, Oregon, Washington, and Idaho observed less than 75% of their seasonal total (see Figure 1), which resulted in deficiencies of 2 to 4 inches in the normally drier sections of southern and central California, eastern Oregon and Washington, Idaho, and western Montana, while deficits of 8 to 22 inches were found in the normally wetter areas of coastal Washington, Oregon, and northern California (see Figure 2). Only extreme southern California, the Southwest, west-central Oregon, southeastern Washington, and the northern Cascades observed normal seasonal precipitation. Totals generally increased from south to north, and from east to west (see Figure 3), with the coastal locations of the Pacific Northwest accumulating the largest amounts.

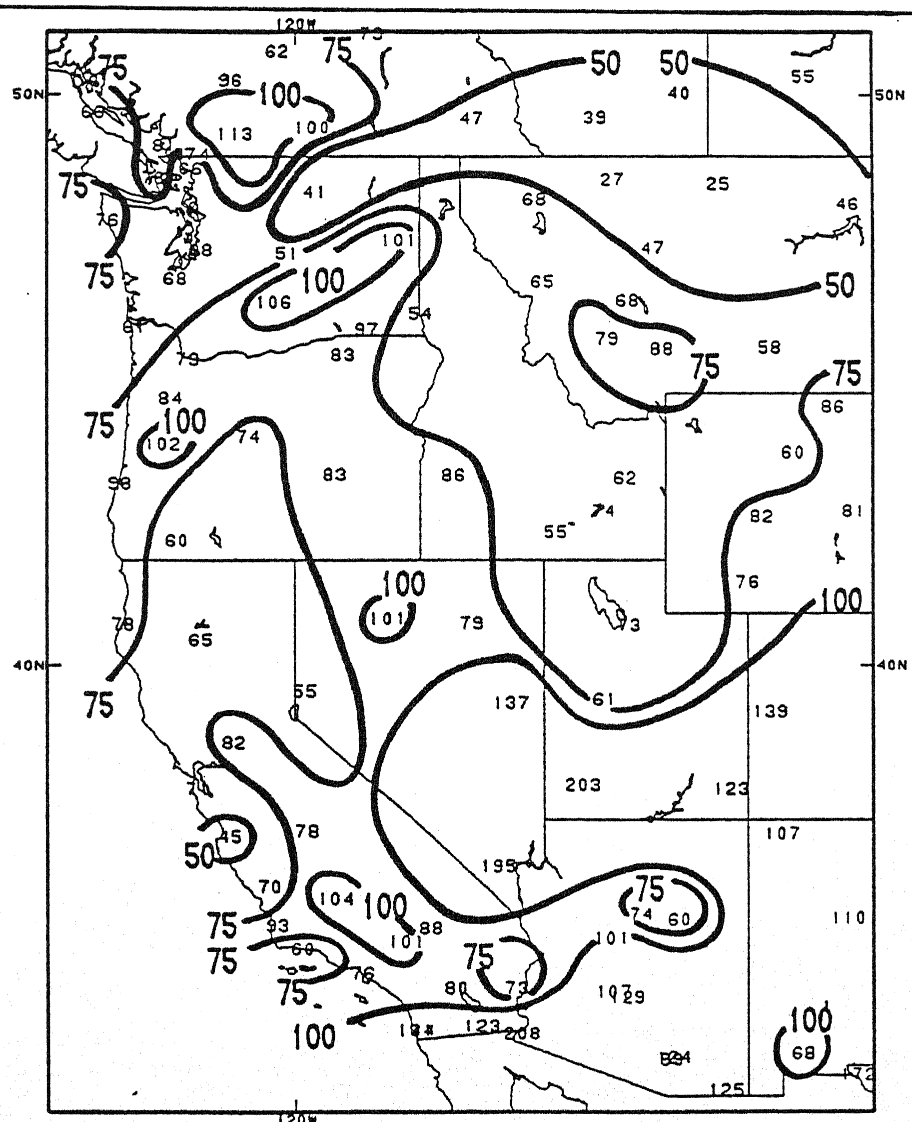


Figure 1. Percent of normal precipitation from 10/87-4/88. Smallest percentages were located in California and the northern Rockies.

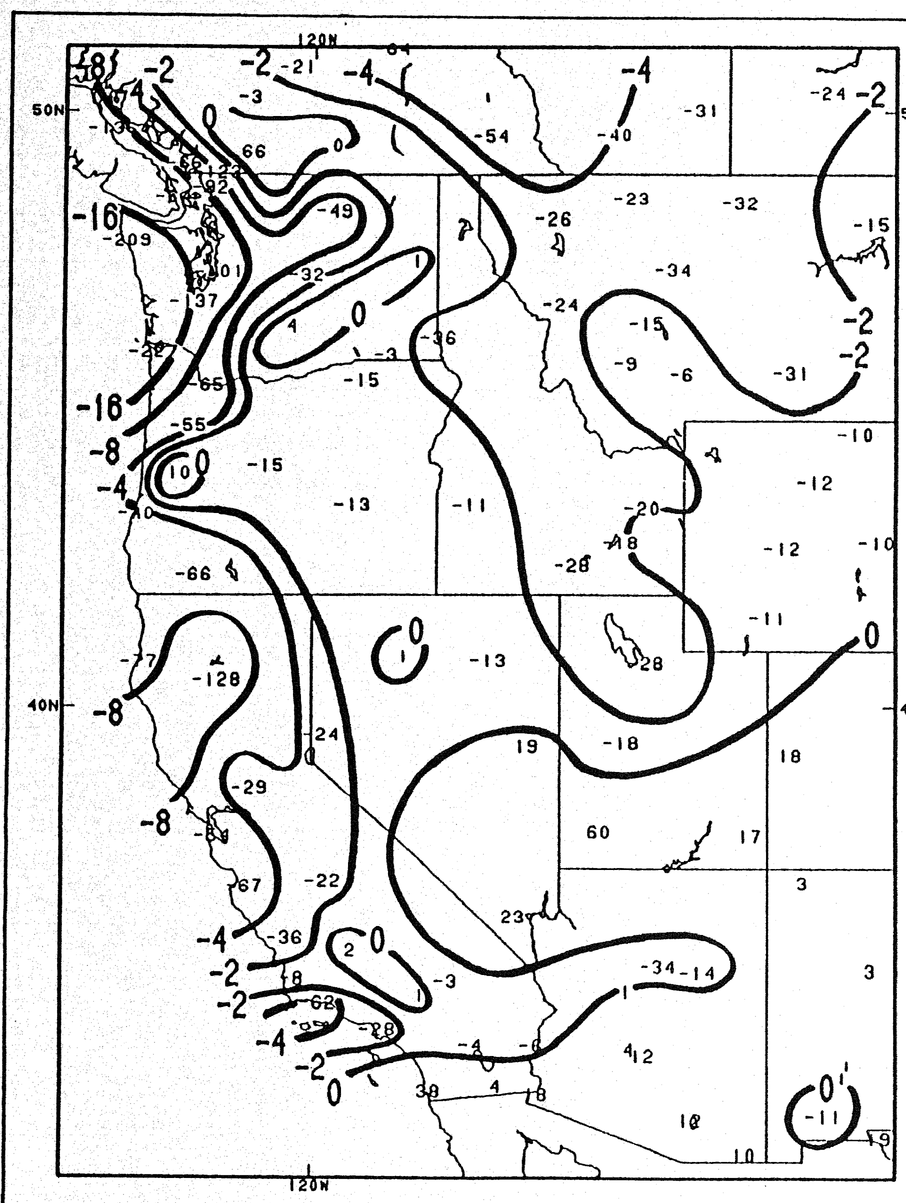


Figure 2. Departure from normal precipitation (in inches) during 10/87-4/88. Station values are in tenths of inches. Largest deficiencies during the 1987-1988 rainy season were located along the coasts of Washington, Oregon, and northern California.

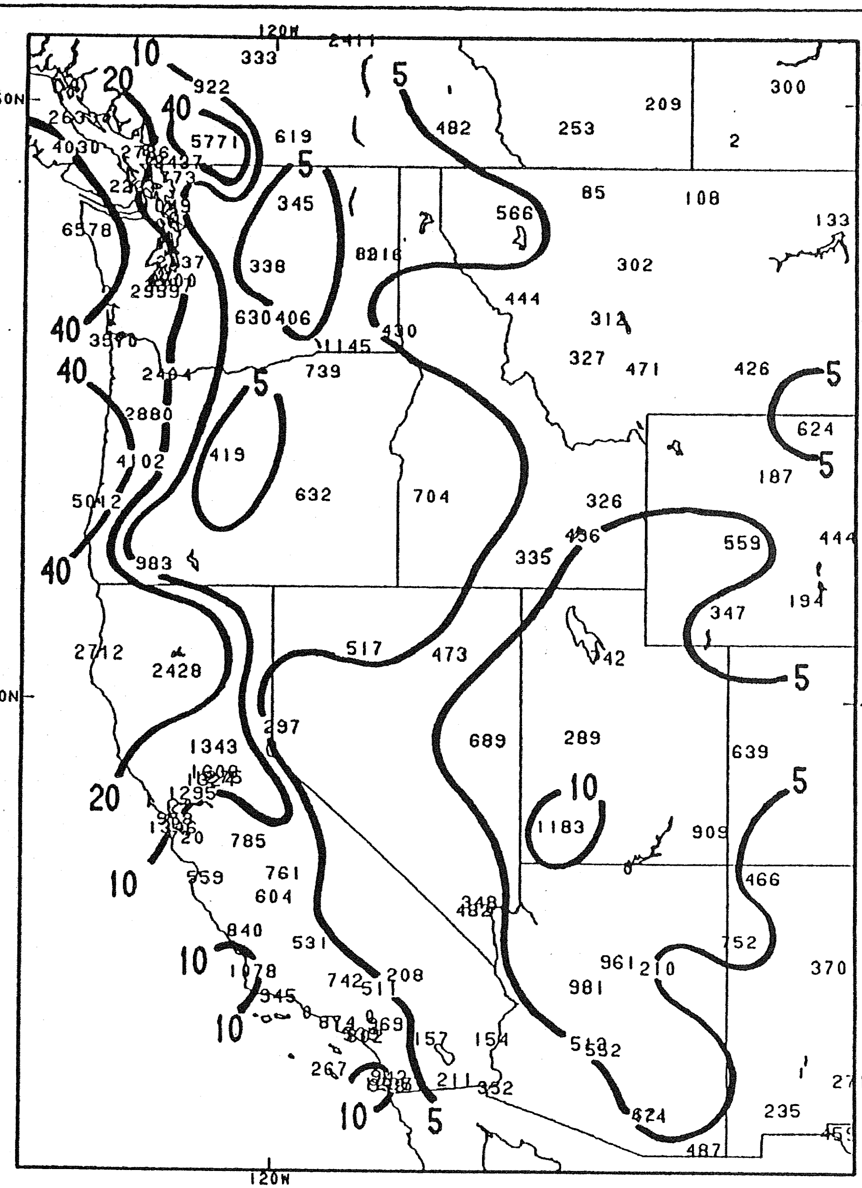


Figure 3. Total precipitation (in inches) from 10/87-4/88. Station values are in hundredths of inches.

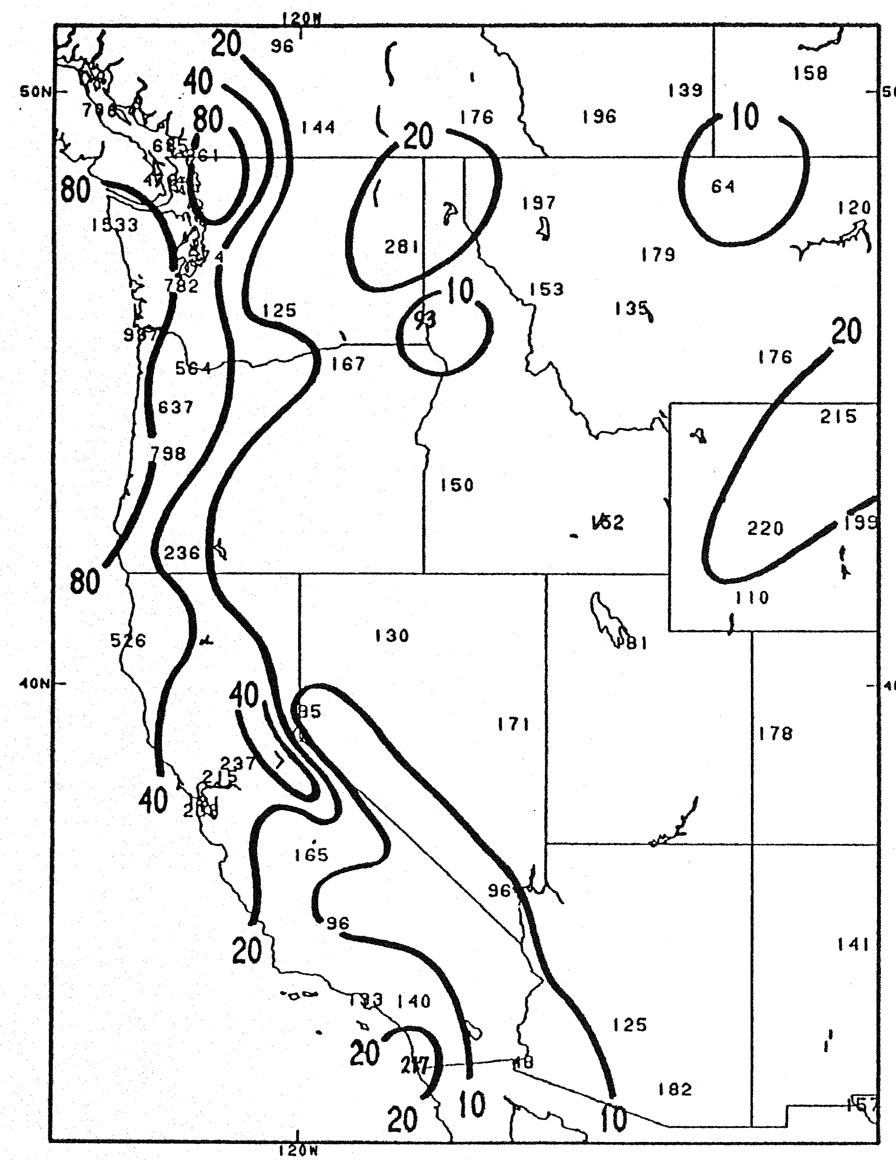


Figure 4. Total precipitation (in inches) from 10/86-4/88, with station amounts in tenths of inches.

This marked the second consecutive rainy season that was below normal. Since October, 1986, even though 80-150 inches had fallen along the Pacific Northwest coast with lesser amounts farther south and east (see Figure 4), much of the area still experienced less than 80% of their normal precipitation (see Figure 5). Accumulated deficiencies totaled between 5-10 inches in the normally drier southern and eastern parts of the West and 20-40 inches in the normally wetter northern and western sections (see Figure 6). According to press reports, the reduced seasonal precipitation has resulted in much-below normal snowpack, hence, snow-melt runoff in rivers through mid-summer is expected to be abnormally low. To prepare for this shortcoming, several California cities have already imposed water conservation rules. In addition, since precipitation dramatically decreases in the West during the spring and summer months (see Table 1), the best chances for significant rainfall to reduce the region's deficits may have to wait until the start of the 1988-1989 rainy season.

Table 1. Monthly normal precipitation amounts (in inches) for selected stations in the western United States, based on 1951-1980 data.

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
San Diego, CA	2.09	1.42	1.59	0.76	0.23	0.05	0.00	0.11	0.18	0.31	1.08	1.34
San Fransisco, CA	4.64	3.21	2.62	1.51	0.30	0.10	0.03	0.04	0.19	1.05	2.33	3.53
Fresno, CA	2.03	1.83	1.59	1.13	0.30	0.07	0.00	0.00	0.15	0.41	1.22	1.59
Eureka, CA	6.98	5.18	5.03	2.90	1.58	0.54	0.09	0.36	0.89	2.69	5.88	6.20
Portland, OR	6.15	3.91	3.59	2.28	2.06	1.45	0.44	1.11	1.59	3.03	5.15	6.40
Boise, ID	1.62	1.05	1.02	1.17	1.19	0.93	0.24	0.39	0.57	0.73	1.27	1.31
Helena, MT	0.66	0.44	0.69	1.01	1.72	2.01	1.04	1.18	0.83	0.65	0.54	0.61
Seattle/Tacoma,WA	6.02	4.20	3.57	2.39	1.56	1.36	0.72	1.25	2.00	3.42	5.58	6.31
Quillayute, WA	14.32	12.17	11.97	7.25	5.19	2.80	2.65	2.91	6.15	10.42	13.08	17.48

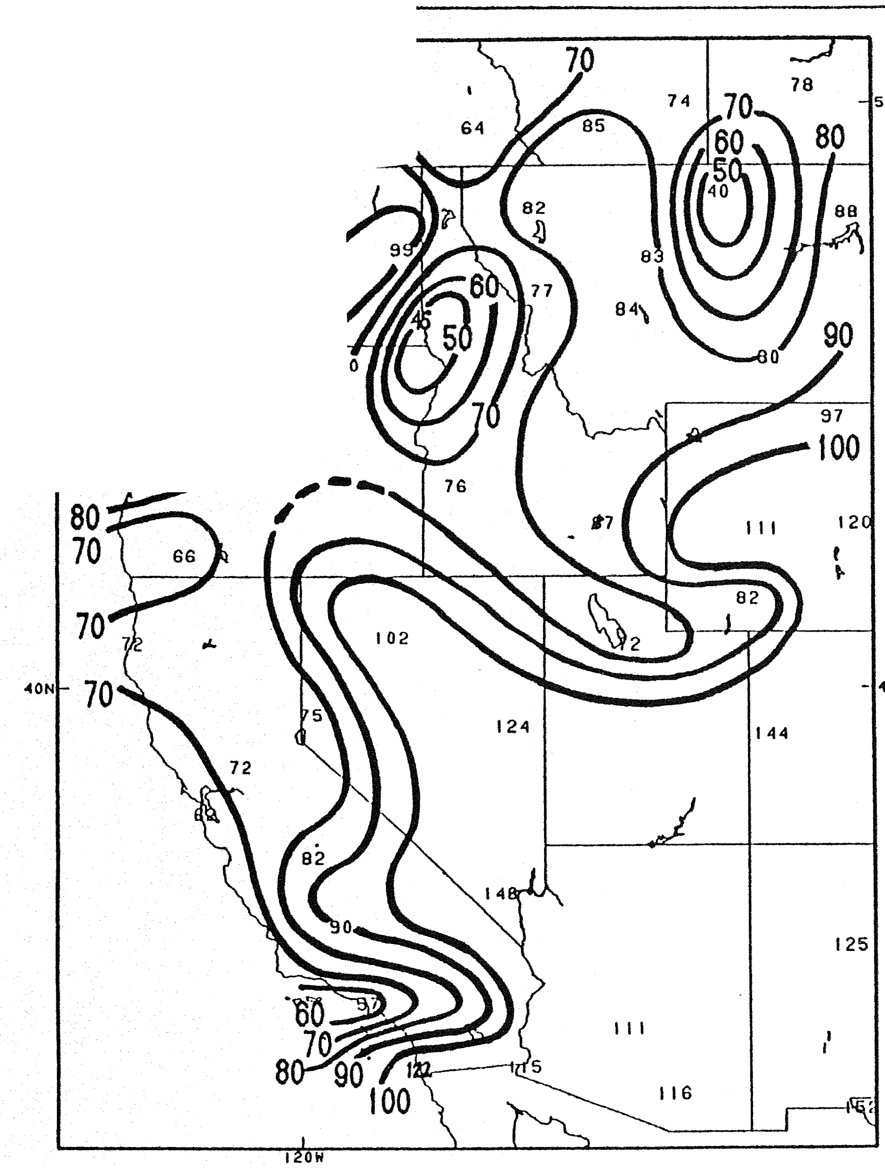


Figure 5. Percent of normal precipitation during 10/86-4/88. Abnormally low precipitation has fallen in much of the West over the past year and a half.

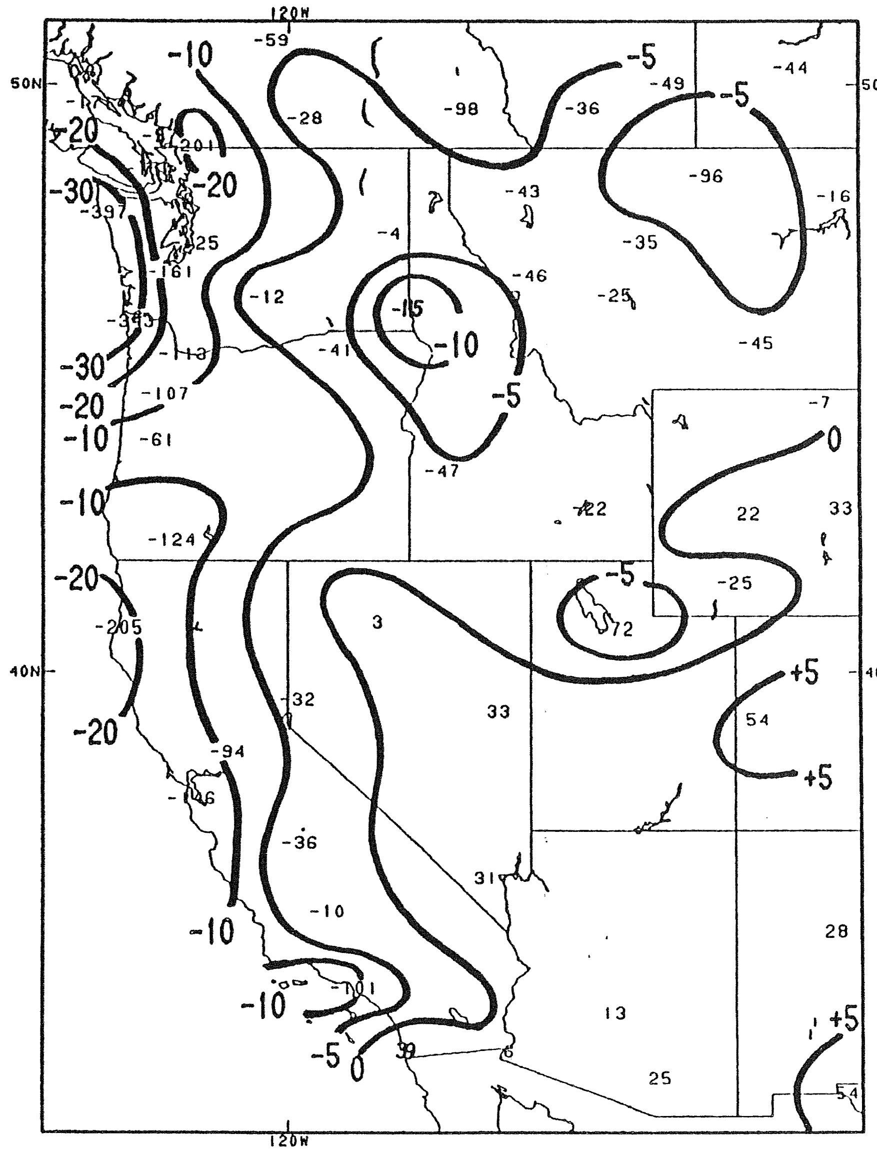


Figure 6. Departure from normal precipitation (in inches) from 10/86-4/88. Station values are in tenths of inches. Huge deficits exist in along most of the West Coast.

The Southeast has endured several periods of dryness over the past four years (see Weekly Climate Bulletin dated 3/26/88). This year has been no different as the region has suffered from below normal precipitation since late January. Excess April rainfall provided some temporary relief to parts of the area, however, drier weather has returned in May. Since January 24, central Tennessee, northern Alabama, Mississippi, and Georgia, and the western Carolinas have observed less than half their normal precipitation (see Figure 7) and have accumulated precipitation deficits of more than eight inches (see Figure 8).

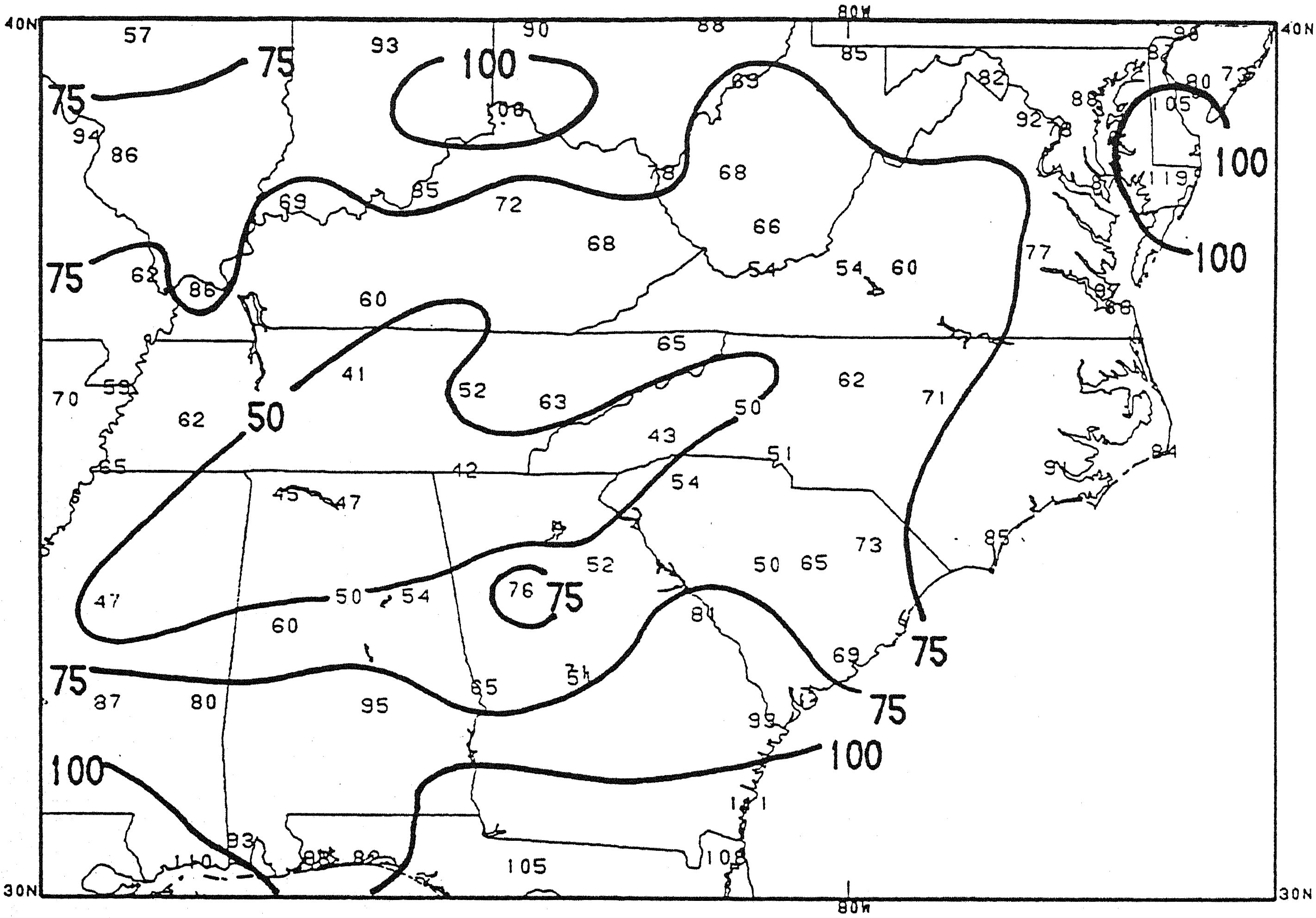


Figure 7. Southeast percent of normal precipitation during 1/24-5/14/88. Much of the Tennessee Valley and southern Piedmonts have measured only half their normal precipitation.

Table 2. Monthly normal precipitation amounts (in inches) for selected stations in the southeastern United States, based on 1951-1980 data.

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Nashville, TN	4.47	4.01	5.56	4.45	4.54	3.67	3.81	3.38	3.69	2.56	3.50	4.60
Birmingham, AL	5.21	4.69	6.60	4.98	4.51	3.59	5.37	3.83	4.32	2.61	3.62	4.93
Macon, GA	4.26	4.44	5.17	3.52	3.79	3.73	4.46	3.64	3.29	1.98	2.32	4.05
Columbia, SC	4.38	3.99	5.17	3.59	3.85	4.44	5.35	5.56	4.23	2.57	2.52	3.50
Asheville, NC	3.17	3.24	4.78	3.46	4.06	3.70	3.81	4.35	3.79	3.13	3.09	3.17
Richmond, VA	3.21	3.11	3.56	2.89	3.53	3.57	5.12	4.99	3.50	3.72	3.28	3.37
Beckley, WV	3.40	3.20	3.99	3.44	3.57	3.97	4.71	3.69	3.60	2.68	2.85	3.12
Louisville, KY	3.35	3.22	4.71	4.09	4.13	3.58	4.08	3.30	3.33	2.61	3.47	3.46
Jackson, MS	4.98	4.25	5.56	5.66	4.91	3.11	4.60	3.58	3.54	2.37	3.92	5.37

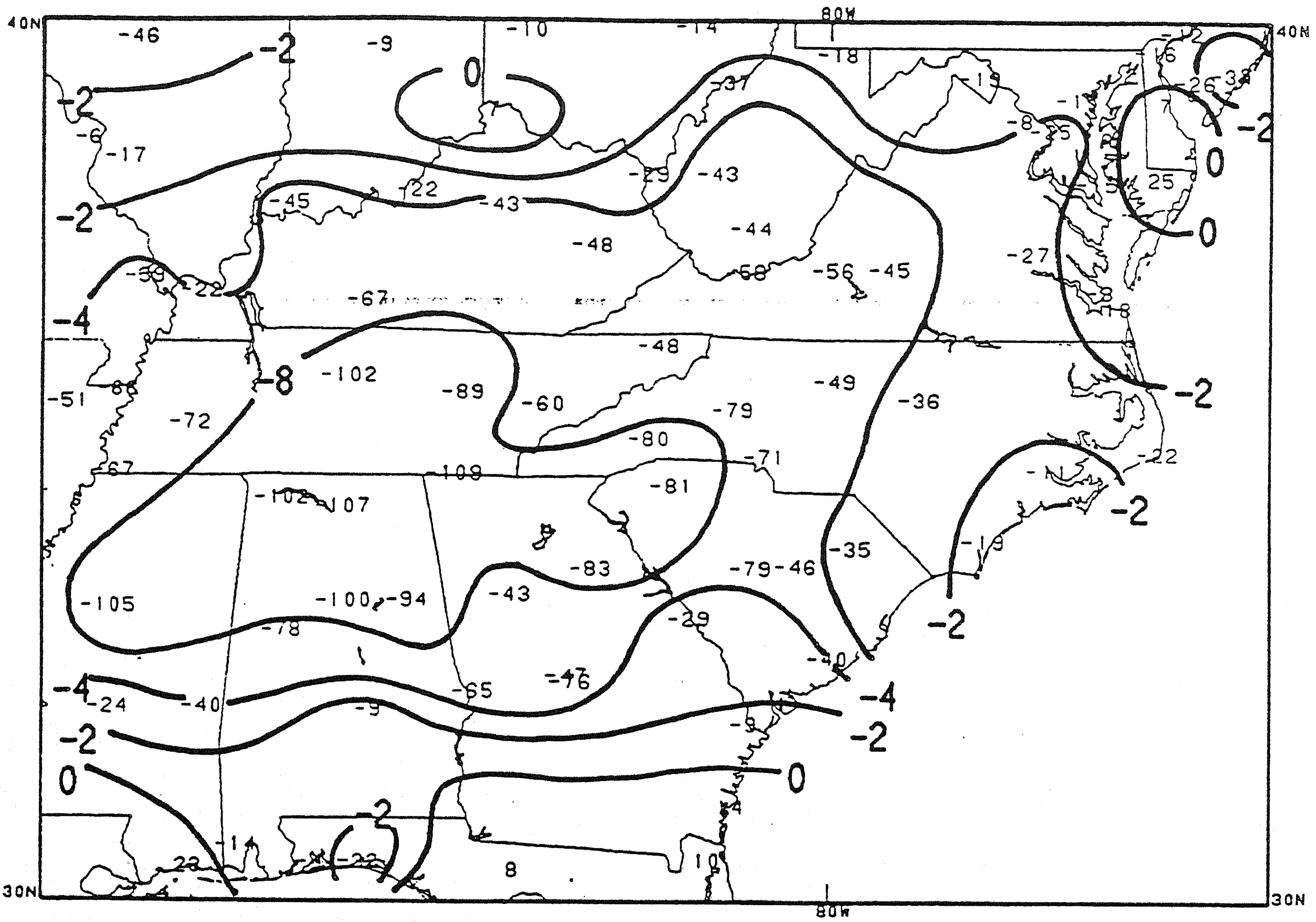


Figure 8. Departure from normal precipitation (in inches) during 1/24-5/14/88. Station values are in tenths of inches.

Over the past two and a half years (1/86-4/88), the frequent occurrence of drought in the Southeast has created deficiencies of 20-40 inches (43.3 inches at Nashville, TN) throughout the Tennessee Valley and southern Piedmonts (see Figure 9). Both of these areas generally correspond to the regions with less than 80% of normal precipitation (see Figure 10) and under 100 inches of total precipitation (see Figure 11). According to the Tennessee Valley Authority (TVA), impacts on recreation, hydro generation, and water quality are being adversely affected by several years of below normal precipitation. With the start of the growing season and warmer weather, substantial rainfall is needed to assure sufficient short and long-term moisture supplies in the near future. As shown in Table 2, normal summer rainfall amounts can greatly fluctuate from month to month depending upon the location.

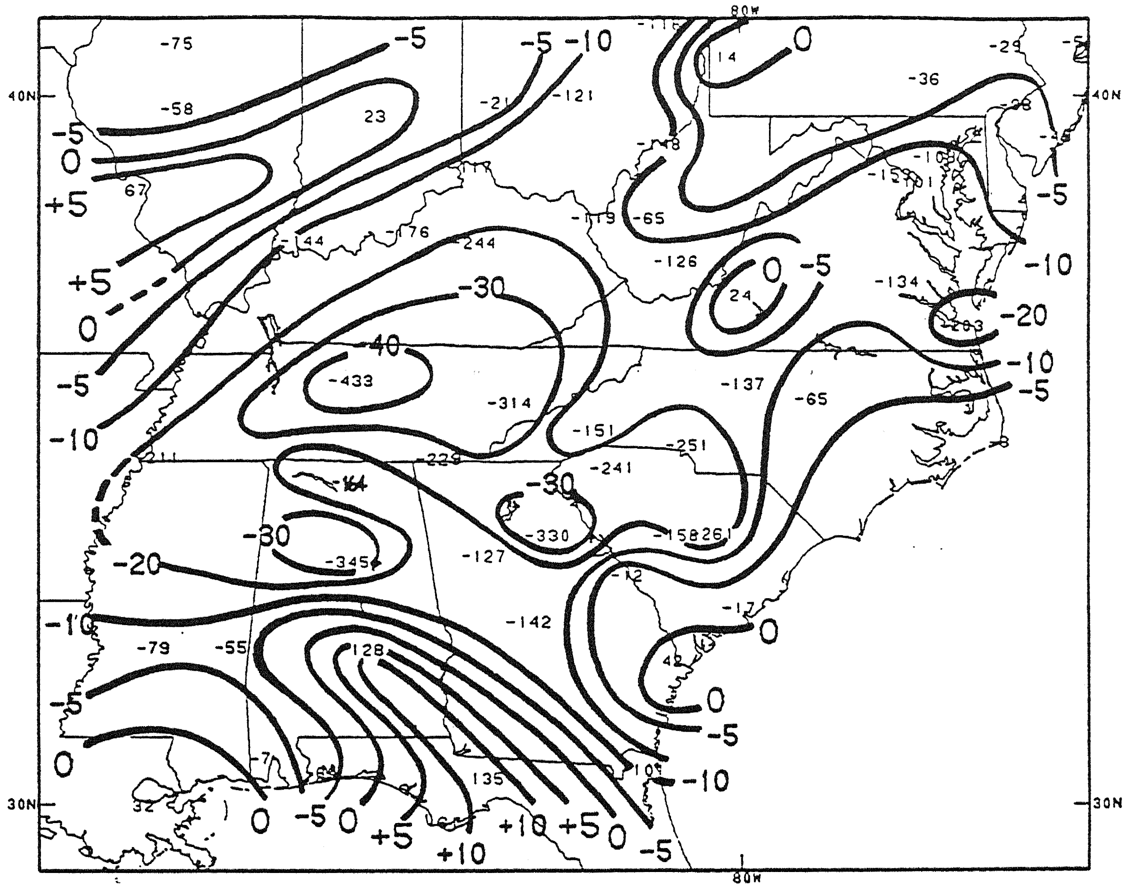


Figure 9. Long-term precipitation deficiencies (in inches) in the Southeast from 1/86-4/88. Station values in tenths of inches. Substantial deficits have accumulated in the Tennessee Valley over the past 2 1/2 years.

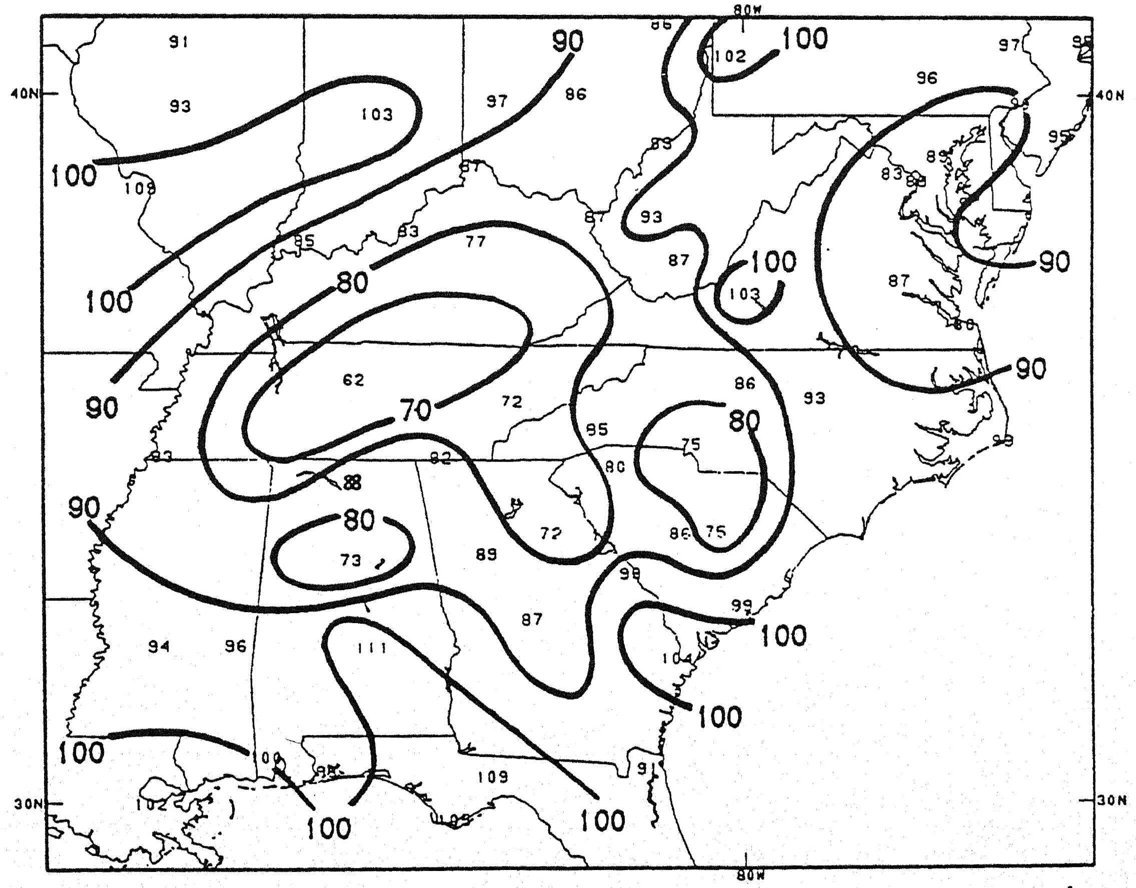


Figure 10. Percent of normal precipitation during 1/86-4/88.

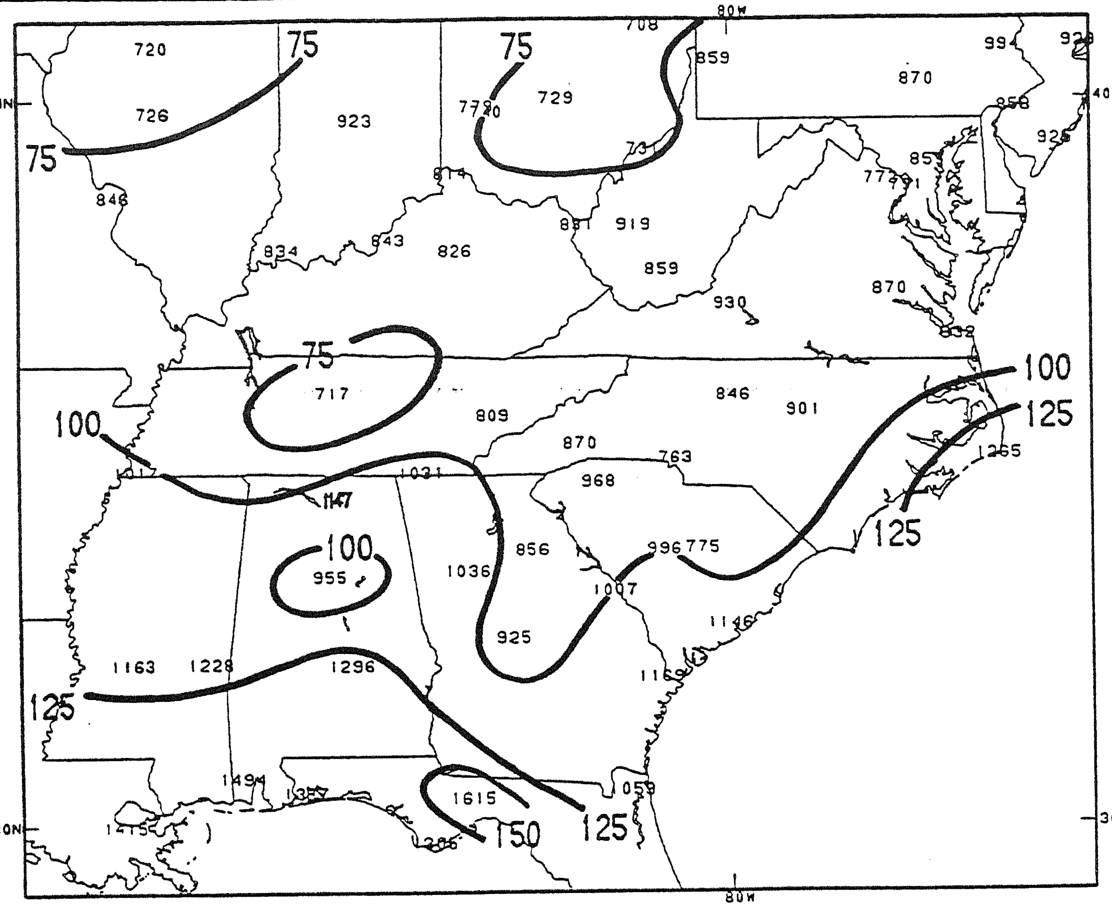


Figure 11. Total precipitation (in inches) in the Southeast from 1/86-4/88, with station amounts in tenths of inches.

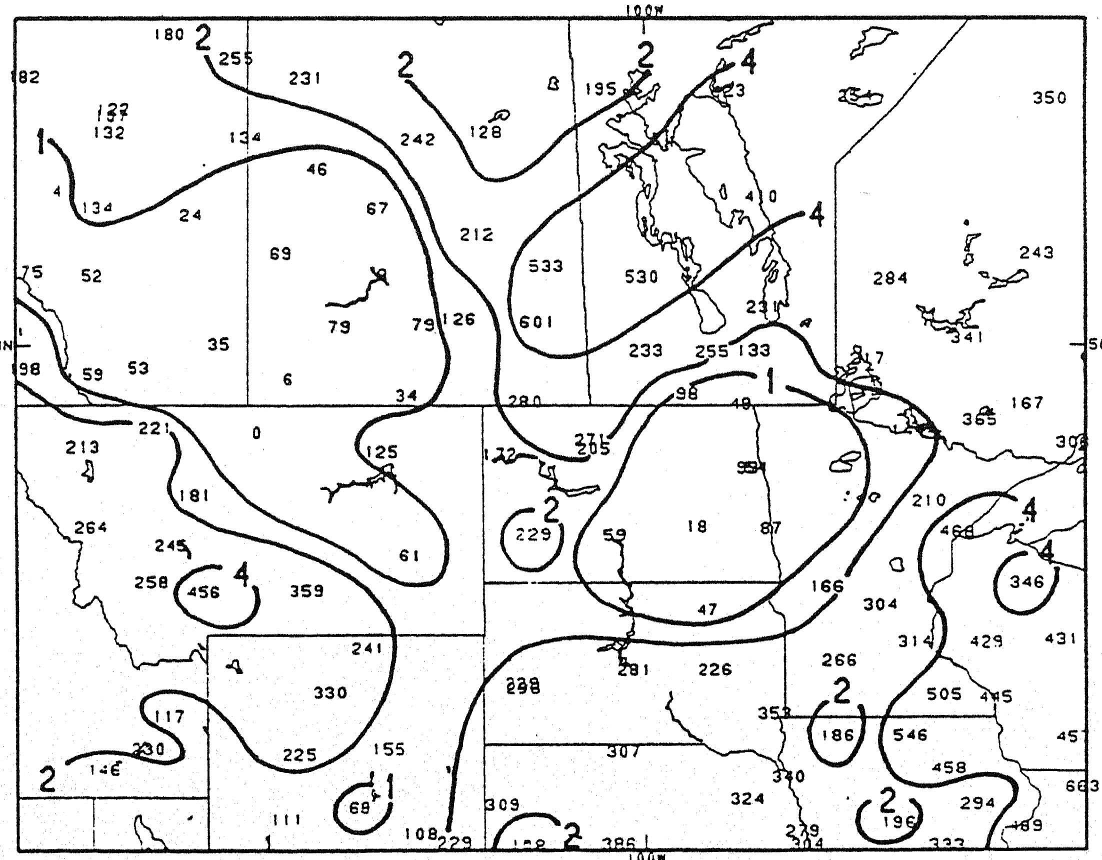


Figure 12. Total precipitation (in inches) since the first day of Spring. Station values are in hundredths of inches. Precipitation has been rather scanty in parts of the northern Great Plains and southern Canada.

Since the first day of Spring (March 20), precipitation amounts in the north-central U.S. and south-central Canada have widely varied, with values ranging from 0 in northern Montana (Helena, MT) up to 6.01 inches in southeastern Saskatchewan (Broadview, SK) (see Weekly Climate Bulletin dated 4/30/88 for an earlier review of the region). Overall, the smallest totals are located in northern Montana, eastern North Dakota, northern South Dakota, northwestern Minnesota, southern Alberta, and southwestern Saskatchewan (see Figure 12). Largest precipitation departures below normal (see Figure 13) are found from southwestern Alberta southeastwards into northeastern Wyoming, in eastern North Dakota, western Minnesota, and northeastern South Dakota, and in much of Iowa. These same areas have also measured less than 50% of their normal spring precipitation (see Figure 14). In northwestern Minnesota, the Associated Press recently reported that high winds had blown away tons of dry topsoil, while South Dakota declared twelve counties state disaster areas. Hopefully, the late spring and summer months, which normally provide the bulk of the region's annual precipitation (see Table 3), will bring excess rainfall and alleviate the abnormally dry conditions before any more significant losses occur.

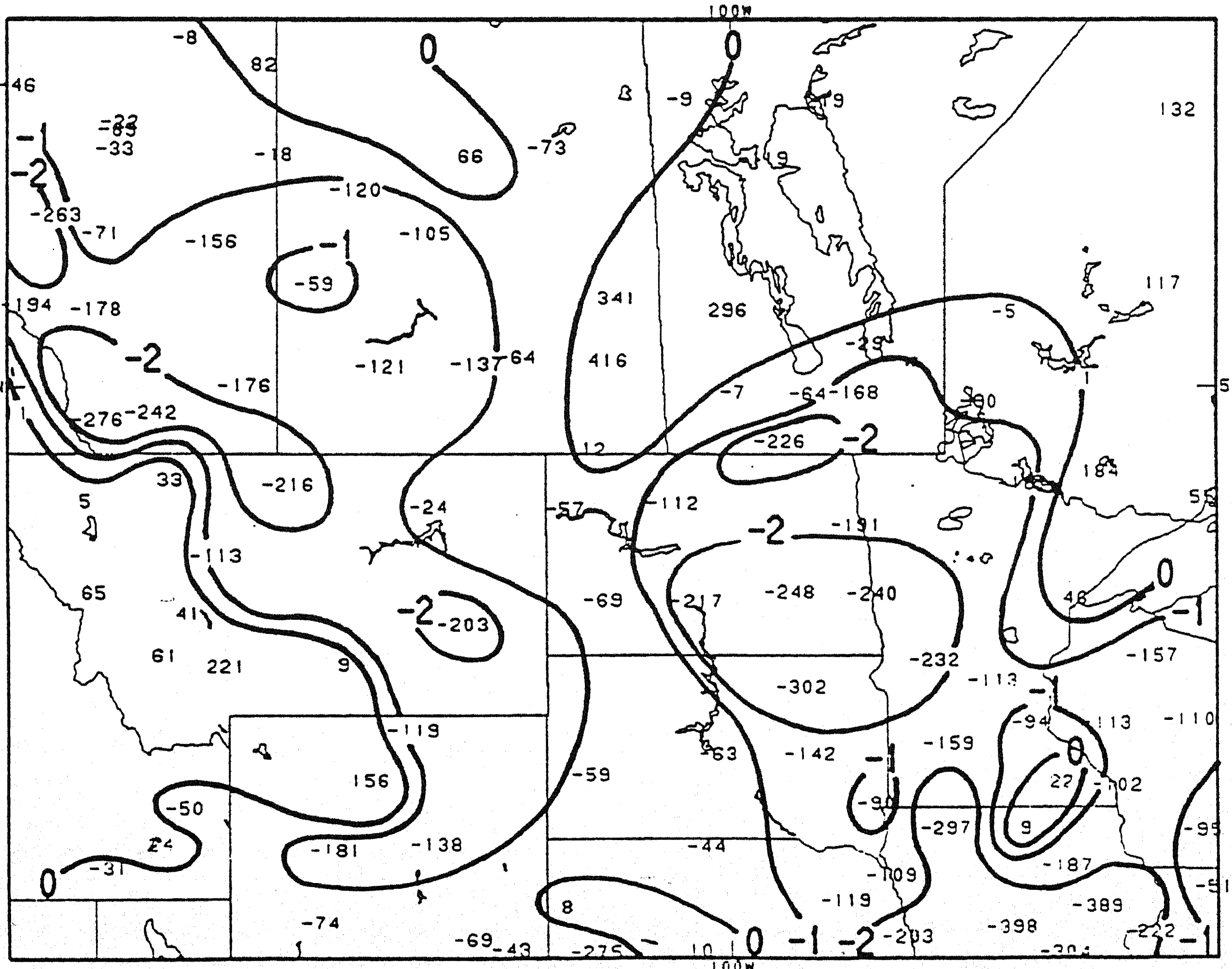


Figure 13. Departure from normal precipitation (in inches) since March 20. Station amounts in hundredths of inches. As precipitation normally increases during the spring and summer, the lack of rainfall will rapidly enlarge existing deficiencies.

Table 3. Monthly normal precipitation amounts (in inches) for selected stations in the north-central U.S. and south-central Canada, based on 1951-1980 data.

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bismarck, ND	0.48	0.43	0.68	1.49	2.21	2.99	2.03	1.68	1.36	0.78	0.49	0.49
Fargo, ND	0.53	0.39	0.81	1.88	2.21	3.04	3.32	2.65	1.85	1.27	0.78	0.61
Sioux Falls, SD	0.48	0.91	1.56	2.34	3.19	3.68	2.69	3.11	2.77	1.55	0.91	0.70
Minneapolis, MN	0.80	0.84	1.69	2.03	3.18	4.05	3.50	3.62	2.48	1.83	1.27	0.85
Des Moines, IA	0.99	1.10	2.18	3.20	3.94	4.15	3.20	4.09	3.07	2.15	1.50	1.03
Sheridan, WY	0.73	0.76	1.06	2.00	2.42	2.24	0.94	0.96	1.16	1.16	0.81	0.69
Winnipeg, MB, Canada	0.84	0.69	0.89	1.52	2.59	3.16	2.99	2.96	2.10	1.21	0.99	0.76
Regina, SK, Canada	0.66	0.63	0.70	0.94	1.83	3.14	2.10	1.76	1.44	0.74	0.54	0.66
Edmonton, AB, Canada	0.96	0.74	0.73	0.85	1.67	3.05	3.50	3.07	1.54	0.65	0.62	0.97

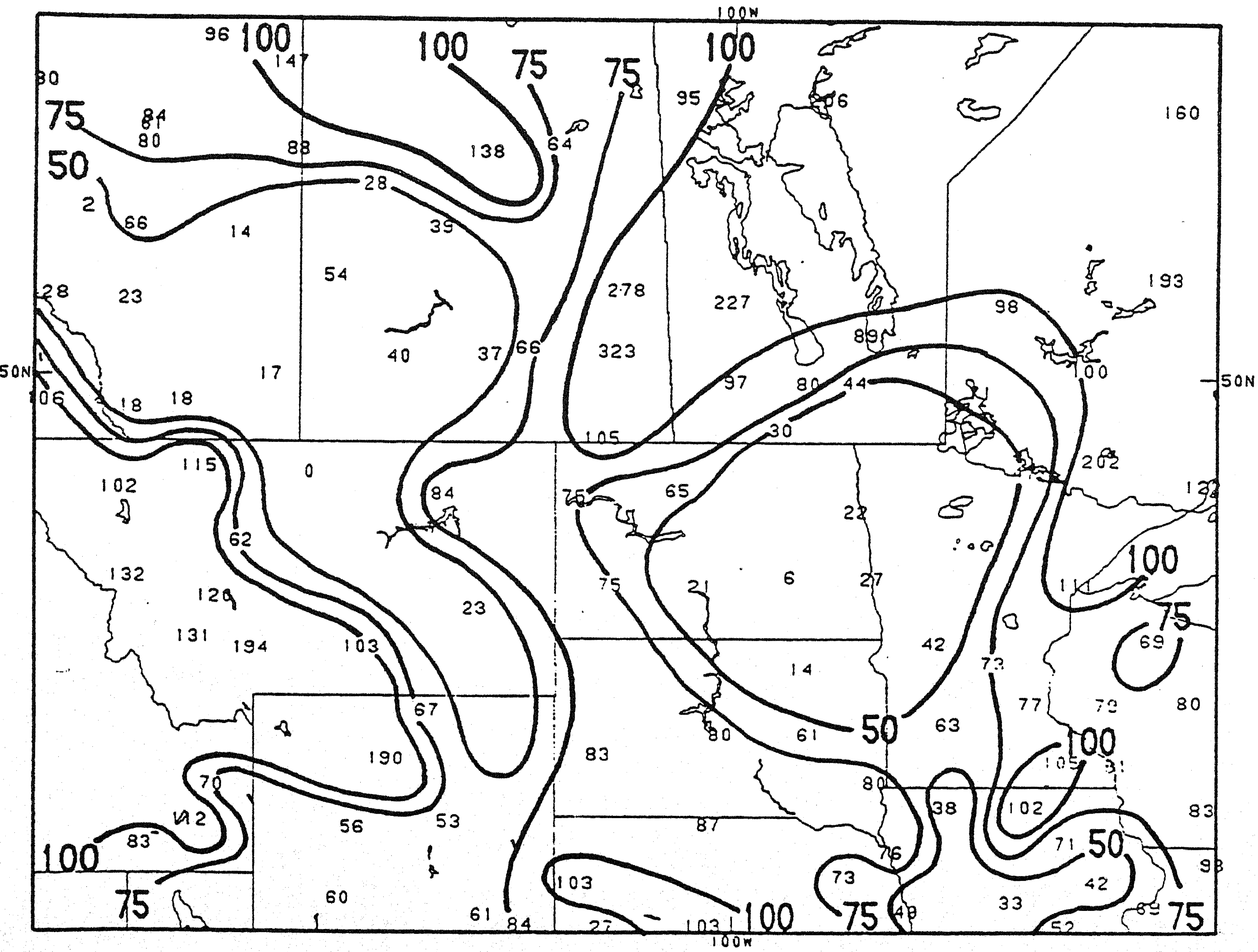


Figure 14. Percent of normal precipitation during 3/20-5/14/88. Less than half the normal springtime precipitation has fallen in parts of the northern Great Plains and southern Canada.

In the southern U.S., parts of Texas, most notably the eastern and southern sections (see Figures 15 and 16), have recorded less than half their normal precipitation since September 1, 1987. The current situation is the exact opposite of what occurred last Spring as torrential thunderstorms inundated much of south-central Texas (see Weekly Climate Bulletins of late May and early June, 1987). Deficits of 8-18 inches are common from southwestern Texas northeastwards to the Arkansas border (see Figure 16), while amounts ranged from under 2 inches in the normally arid sections of southwestern Texas up to 41 inches in Port Arthur (see Figure 17).

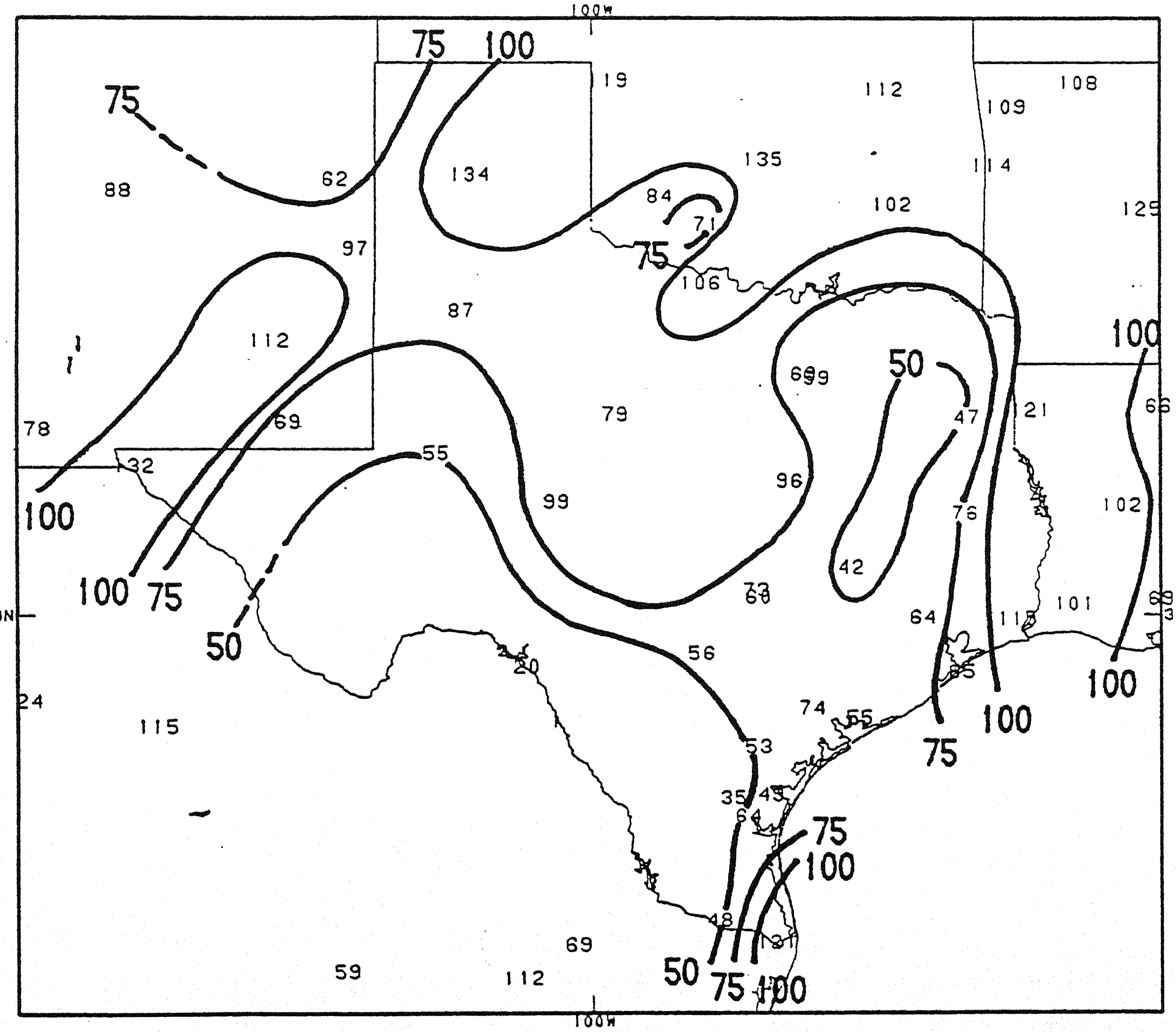


Figure 15. Percent of normal precipitation from 9/1/87-5/14/88. Southwestern and eastern Texas have experienced under half their normal amounts.

Rainfall amounts normally rise during the spring months and reach a maximum in the summer or early fall (see Table 4) in association with the increased flow of tropical moisture from the Gulf of Mexico. After below normal fall and winter precipitation, the upsurge in April rainfall failed to develop. Recently, however, thunderstorm activity has increased in parts of south-central Texas (see this week's U.S. Weather Highlights), but substantially more rainfall is needed to ease both short and long-term soil moisture deficiencies.

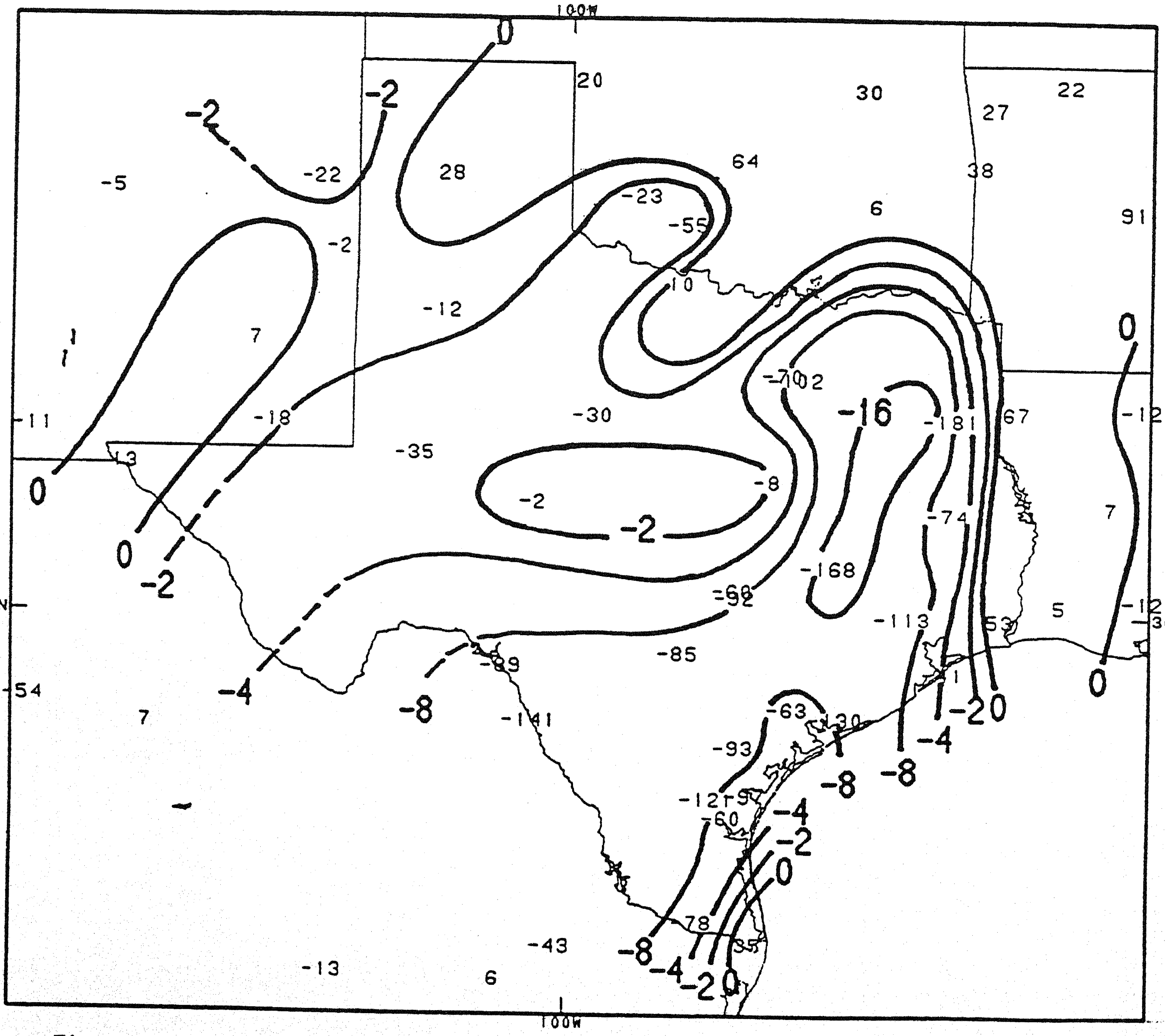
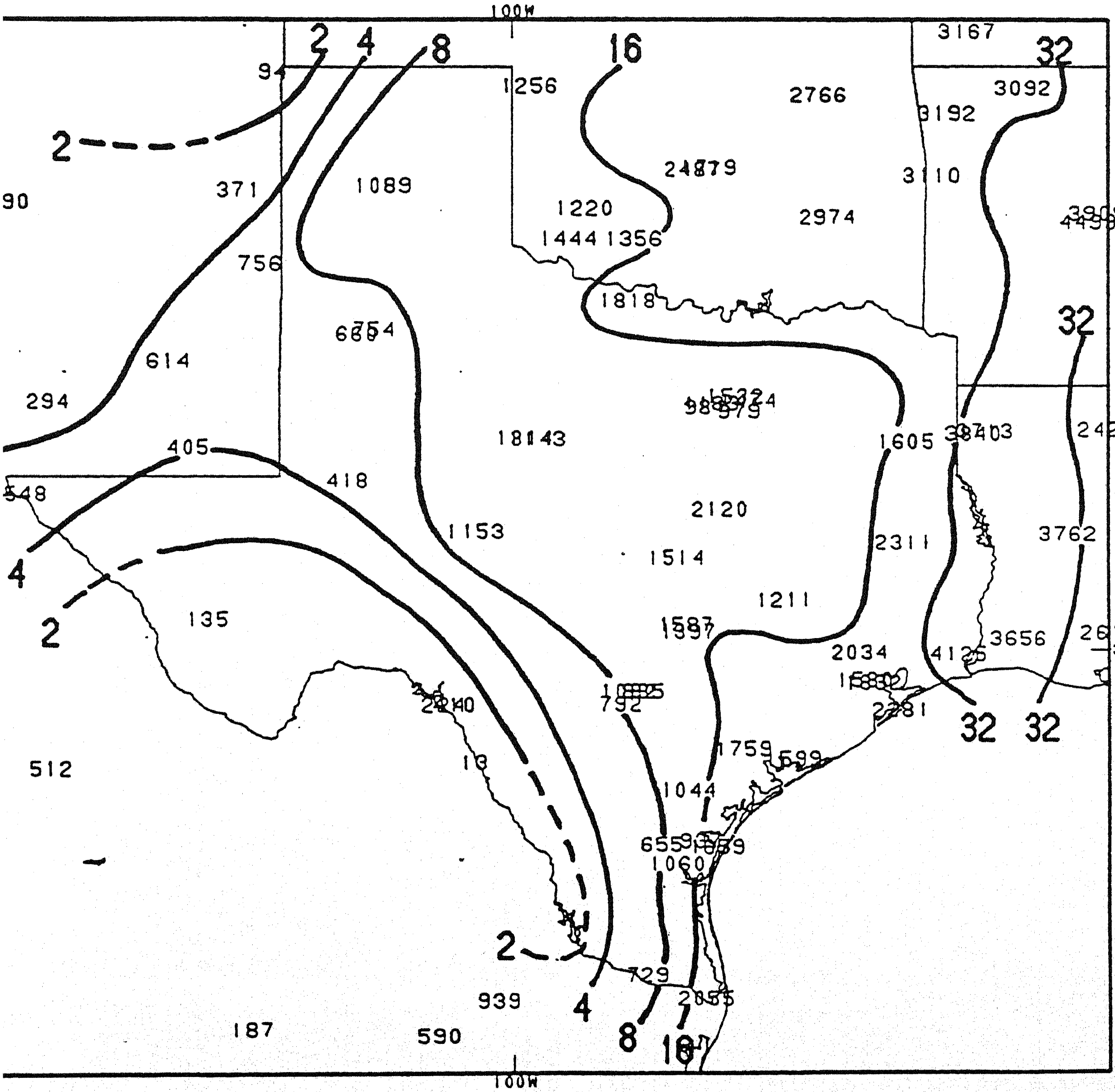


Figure 16. Departure from normal precipitation (in inches) since September, 1987. Station values are in tenths of inches. Much of eastern Texas is 8 to 16 inches below normal.

. Monthly normal precipitation amounts (in inches) for selected stations in Texas, based on 1951-1980 data.

l	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
), TX	0.36	0.43	0.31	0.18	0.22	0.54	1.58	1.19	1.40	0.70	0.32	0.37
.o, TX	0.44	0.55	0.86	1.05	2.77	3.48	2.68	2.93	1.70	1.37	0.56	0.47
;elo, TX	0.62	0.82	0.77	1.73	2.50	1.85	1.20	1.83	3.02	2.04	0.96	0.62
'ille, TX	1.24	1.53	0.49	1.56	2.13	2.69	1.49	2.81	5.23	3.52	1.43	1.14
:onio, TX	1.53	1.84	1.31	2.71	3.65	3.01	1.90	2.67	3.73	2.86	2.32	1.36
'Ft. Worth, TX	1.70	1.84	2.36	4.09	4.33	2.34	2.21	1.99	3.41	3.00	2.09	1.71
ı, TX	3.48	3.31	2.66	3.74	4.78	4.43	3.57	4.02	5.17	3.79	3.60	3.77



ure 17. Total precipitation (in inches), with plotted values in hundredths of inches, during 9/1/87-5/14/88.

APPARENT TEMPERATURE

The apparent temperature is a measure of human discomfort due to combined heat and high humidity. It was developed by R. G. Steadman (1979) and is based on physiological studies of evaporative skin cooling for various combinations of ambient temperature and humidity. The apparent temperature is defined to be equal to the actual air temperature when the dew point temperature is 57.2°F (14°C). At higher dew points, the apparent temperature exceeds the actual temperature and measures the increased physiological heat stress and discomfort associated with higher than comfortable humidities. When the dew point is less than 57.2°F, on the other hand, the apparent temperature is less than the actual air temperature and measures the reduced stress and increased comfort associated with lower humidities and greater evaporative skin cooling.

Apparent temperatures greater than 80°F are generally associated with some discomfort. Values approaching or exceeding 105°F are considered potentially life-threatening, with severe heat exhaustion or heatstroke possible if exposure is prolonged or physical activity is high. The degree of stress may vary with age, health, and body characteristics.

The average daily maximum apparent temperature chart (depicted each week) is the mean value of the seven daily maximum apparent temperature values (the week of Sunday-Saturday) for stations across the contiguous United States. Areas that have average daily maximum apparent temperatures above 90°F are shaded.

Reference: Steadman, R. G., 1979: The assessment of sultriness. Part I: A temperature-humidity index based on human physiology and clothing science. (J. of Applied Meteorology, 18, 861-873.)